

**SYSTEMS CRACKS ARE WHERE THE LIGHT GETS IN:
MODELS AND MEASURES OF SERVICE IN THE BENEFIT OF CONTEXT**

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Proceedings of the 45th Annual Meeting of the International Society for the Systems
Sciences, at Asilomar, California, July 8-13, 2001,
Jennifer Wilby and Janet K. Allen, editors
ISBN 09664183-6-0
<http://www.iss.org>
conference chaired by: Harold G. Nelson (ISSS), e-mail: Nelsongroup@worldnet.att.net

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Proceedings of the

ISSS 2001

The 45th Annual Meeting of the International Society for the Systems Sciences

July 8-13, 2001, Asilomar, California

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ISBN 09664183-6-0

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ABSTRACT

A paradox is emerging for those concerned about management theory and practice. The paradox lies with the activities and products of organizations becoming more fluid while organizational structure and management models remained fixed. Managerial emphasis favor the more “solid” aspects of organizations while their leading edges become more “fluid.” Management lore and principles continue to be taught, and practiced, as if what was remains timeless. Management continues to base its decision-making on information from statistical and reductionistic analysis. The result is a noteworthy mismatch between the rate of change in the environmental and the human desire for constancy. The mismatch is showing up on the surface of situations in what we herein called “cracks.” Cracks can also be seen in the surfaces of organizations, products and customer bases.

The theory behind the paper comes from the early 1940s. Cracks point to system forces that were not been reconciled within the limits of the system. “Crackage” may also be a sign of systems reaching their limits. Herein the systems of interest are social organizations and their management. The main interest thus becomes management theory, where cracks appear where a principle appears inadequate, even humorous, in the face of an organizational challenge. Such cracks are more obvious with time. Using command and control strategies to manage internet information access and use is one example. Such cracks can be seen as early indicators of larger problems looming for organizations. This point was at the center of a discussion held in the business systems interest group session of last year’s ISSS Conference. It was argued that radically different forms and norms of management were needed. One metaphor proposed from that discussion was to find more “fluid” methods of management for dealing with increasingly fluid entities and environments. This idea is used herein to describe

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one of the major events now taking place in economic and business systems, the transformation from goods to services. The shift from solid to fluid processes and products is clearly seen in the emergence of the importance of services. An alternative software operating system, called Linux, is presented as a leading example of why this change is different and fundamental. Linux provides a doorway into an alternative model of business management. Linux illustrating an interesting progression from problems in solids that are manageable, but tend to crack, to fluids that don't crack but tend to be beyond understanding and management.

Key words: Change, Structural Cracks, New Services, New Business Values, Linux OS

INTRODUCTION

An obvious mismatch is growing between human actions and the ideas they use for managing their activities. Evidence from the action side suggests a need for radical changes in thoughts that guide action. We can see this most clearly in business systems. It has long been argued that business management models need to be more robust and systemic. Systems-thinking is now being more widely relied upon, yet even this major step forward appears insufficient to current demands. Thinking systemically does not guarantee the innovation now needed. Business and organizational systems are richly connected, much like a system, but systemic framework is no longer in a traditional sense of nodes with a fixed network of lines between points. The lines are disappearing by merging, and the resulting system behaves more like a fluid than a fixed system. It is as yet unclear how traditional systems-thinking will accommodate this situation.

The focus of management practice remains with the traditional, and relatively solid "shell" that separates two worlds of fluid changes: the inner entity and the outer environment. Concentrating on the shells somehow seems to miss the underlying issues. While organizational shells do provide form and constancy, they are mostly the last refuge of stability. They are the primary subject in management texts. Shells help provide: definition, protection and security from internal and external threats. Even though the shells clearly tend to entrap and restrict change they offer predictability and are thus important to traditional management practice.

Cracks seemed to emerge and grow throughout business operations during the nineteen-nineties. Cracking is an early warning signal for the very fundamental process first raised by Andras Angyal in his concern for what happens when a system reaches its limits (Angyal, 1941). As one of the earliest systems scientists, he addressed two fundamental questions: 1) what was a system, and 2) what did it mean for a system to reach its limits?

Herein we will accept cracks as signs of limits in systems. We will describe the behavior of an entity moving away from the dilemmas generating by traditional approaches and how it moves to a new form in a self-regulatory manner. The

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example involves the contextual shift from a goods based economic system towards one based on services. Based on this shift an advanced transition is now be underway. Its early results are consistent with the move from the solid. The shift is from goods towards services connected to goods. Therein the services as non-proprietary activities separated from goods. Current results point to robust, non-goods based systems of economic exchange.

Returning to the theme in the title of this paper, where a shell encounters significant difficulties, from forces inside or from its environment, there are stresses. The most visible signs of difficulties with these shells can be seen in their “cracks.” The paper thus begins with crackage as sign of danger. Cracks historically pointed to and shed light upon areas for effective innovation; especially from 1955 until 1995. Now there are larger forces of danger than what lay behind the cracks. Traditional objects of management are undergoing even more significant changes. For example, new economy firms brought considerable crackage to traditional industries. The meltdown of new economy firms would seem to have changed this, but it did nothing to return us to previous, more solid, footing. Things have become even more fluid.

A SOLID BASIS FOR FLUID MANAGEMENT

Contemporary management theory emerged in response to industrialization and the perceived need for hierarchical structures and 19th Century English Victorian forms of control. This is seen in the early influence of thinkers such as Adam Smith, Charles Babbage, and FW Taylor. These three were key to the form of modern management as it emerged and is now taught in MBA programs worldwide. The works of these prophets of management, and their dreams for making it scientific, were exemplified in industrial monuments such as Henry Ford’s assembly line. This historical base is endangered by emergence of a new economy based on ideas of machine minaturization, nanotechnology development, biotechnology emergence and rapidly restructured information systems. As such there are large cracks and significant gaps in modern management theory.

The 19th Century fixation on how to ever more efficiently manage solids has been melting away. Now, especially in the systems science community, the challenge is how to more effectively manage that which is unstable. Concern for managing efficiency of accomplishment should be reduced. More attention should be with the underlying objectives that are in serious doubt. It is like arguing for increased privatization and tougher competition between two boxers when the problem is that they are blindfolded. The results only get more humorous, except for the boxers. The crackage in the situation is somewhat like that described by the songwriter Leonard Cohen in 1995 as: “Cracks are where the light gets in, and there are cracks in everything.” A few management theorists are using the “light” to bring innovative change into organizations in crisis. Most are instead proposing methods to stop the crackage; e.g., reengineering, e-business, SAP, building core competence, etc. The unresolved situation is now turning into a

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classical systems process of awaiting reorganization at a higher level. Reorganization will take place, but it may not be in the interest of those involved and affected.

An even more difficult set of problems is now surfacing. It seems that it will require highly innovative forms of organization and management; well beyond what we normally defined as innovative. Cracks in classical solids, as well as the solids themselves, are melting away. A different phase state is emerging. Whether it is fluid or gaseous is unsure. The crackage problem of the nineteen nineties is now being reorganized, but as was stated above, the results may not be good news for those involved; especially any who prefer solidness. This paper addresses the source of the crackage as well as the emergence of the more fluid phase that seems to be following from previously unmanaged cracks. This may be the phenomena described by early systems scientist Andras Angyal in 1941. His concern was with systems reaching limits. He proposed methods to detect these limits and then speculated on what would happen to the system and its parts on the other side of limits being reached. "We are not sure what happens after a system reaches its limits, but it seems that the parts will assume the whole." (Angyal, 1941) The principles of fluid management are intended to be consistent with Angyal's concern and address what it may mean for parts assuming the whole.

IT has become a major source of cracks in the old economy, and in the organizations established to building and manage economic interactions. Biotechnology offers even more sources of crackage. Many innovative and very unorthodox business models are emerging, to take advantage of the new situations created by ICT, but their structure is unsure. They operate more as a flow than a set of identifiable parts. This is leading to serious crackage in the old industrial economy. New kinds of actors, opportunities for acting, and actions emerge daily, but how do we make sense of these and discuss means for controlling them? Herein an unorthodox design of a computer operating system, as it is working at the heart of defining and redefining ICT, is used to exemplify the shift from old economy solids that crack to new economy forms that flow. Called the Linux OS, its potentials are redefining business motivations and operations, and theories for managing both. Linux is herein used as a model and metaphor of future service in a service-based economy.

DEFINING SERVICES THAT CAN SERVE

Services are hard to define. Service producers and products are hard to measure. During the eighties this allowed managers wide latitudes for acting and limited responsibility for failure. The situation is now changed. The actions can still come via a wide variety of forms but each is now traceable to its initiator, and there is little tolerance for failure; i.e., there is room to move but expectations of success are large. Traditional organization tolerances have been reduced by growth in individual empowerment, intolerance and expectations. Traditional ambiguous supply chains have become tight demand lines with

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call buttons attached. There is little space or time for traditional bargaining processes. The cracks in the industrialization have become a map for ICT networks.

A paper was presented at the ISSS meeting in Toronto on an emerging need to shift attention from the 19th Century metaphors on management to 21st Century ideas. It was proposed that the current fixation with organization and management theories was with solids. The dilemma was that such entities as products, employees, money and customers, were acting more fluid than solid. It was proposed that there was value in shifting metaphors, models, measures and practices towards management ideas that were more fluid. The contents herein continues from that basis, but notes that the need is much more urgent than it was a year ago. Managing solids in a more fluid way may have been sufficient a year ago, but in the current environment the solids are now becoming fluid and require even greater degrees of innovation.

It is relatively easy to see continuation of system crackage. This is seen in parts, relations between parts and in systems. Do the cracks come from age, stress or simply too good of good times?

Contemporary management theory emerged alongside development of 19th and 20th Century industrialization. Beginning with the work of a prophet of scientific management (Taylor, 1911), as manifested in Henry Ford's assembly line, and culminating in the pronouncements of prophets and disciples arguing for the advantages of: Excellence, MBO, MBWA, TQM, Strategy Formulation, JIT or being proactive. Throughout this history its gaze was fixed upon industrial processes, where services were mostly seen as an extension of industrial processes. The century began with attempts to separate industrial problems from their environment. What remained was then dissected. The century ended with attempts to force context into the industrial decision-making process and repackage parts as wholes. Excluding context allowed 5-minute managers to make quick, mechanical decisions about mechanically conceived problems. The process ended with a residue of unfortunate consequences that inspired consumers and politicians to require businesses to consideration context.

Tightened organizational tolerances and broaden customer expectations have continued to bring redefinition to the business process. There has been an explosion in growth of services, but as attachments to goods. Goods without service become unsold goods, but the question remained – what were services without goods? Growth in services has been accompanied by wider inclusion of context, but the results have increased complexity and ambiguity. The “reality” that businessmen aspire to “manage” has become almost impossible to see. Many are frustrated by what they see as governmental haze coupled to consumer fickleness. Some wait for the good old days, when business and profits were meaningful. Others are looking for light sources that cut through the fog. Cracks are emerging in the traditional industry system.

In our paper we will examine the idea that these cracks are openings that allow light into the limits of traditional industrial presumptions. We believe that some leading businesspeople are using this light from these cracks in industrialization to lead their

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innovative ideas and responses. The business literature has yet to see it this way. It lumps the innovations into a semi-coherent group titled “the new economy.” The situation is undoubtedly richer and more varied than such terminology would imply. This will not be debated in this short paper. The emphasis instead is with how management theory can evolve in response to the complexity of accommodating context, and encourage more of the innovation that is already taking place? It is unlikely that traditional industrial methods will regain legitimacy. The days and ways of context-free thinking are gone. The cracks are too large, the light is too strong, and the opportunities are too great.

A major source of cracks in the old economy and the means to respond to the varied opportunities now visible is ICT (Information and Communications Technologies). Many innovative and very unorthodox business models have emerged to take advantage of the situation created by ICT. New kinds of actors, opportunities for acting, and actions now emerge almost daily, but how do we make sense of these? The approach taken herein is to examine a special kind of service, called operating system redesign, that is now defining and redefining ICT. Its results are redefining business motivations, operations and management theories.

Many of the management methods that are now taught within schools and practiced within business were developed to help managers be successful in secure, protected and mostly closed systems. Statistical research and quantitative methods were quite helpful in detecting movements at the edges of the operating space. As long as the researcher could find the right balance between including too little and too much, traditional management tools were helpful. In an unstable, challenging and open environment these tools not helpful. Those at the front lines of business development illustrate very different values, models and arguments. Traditional models are encountering new levels of failure (Bohm, 1992). Change is everywhere. The evolution of physics in this century, in its shift from Newton to Strange Attractors at a Distance, may be instructive to those seeking a sense of what faces organizational management that still relies on Newtonian metaphors and models (Bohm, 1985).

SERVICES AS THE FLUID ASPECT OF GOODS, OR THE GOOD ASPECT OF FLUIDS

What is the nature of change and how do we best deal with its implications? Traditional methods of managerial analysis do allow us to find causal relationships, and thus provides clear directions, but are the directions beneficial? Such applications seem to only further confuse the situation of which they are a part. In the physical sciences this process was clearly articulated in the work of the eminent physicist David Bohm. Beginning in a critic of the Hiesenberg uncertainty principle and ending in his radical notion of their being an “implicate order” with “unfolding meaning” he described a general basis for societal redevelopment of current organizations.

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“The change in the order which underlies society is, in certain ways, not unlike those changes in paradigms that are associated with a scientific revolution. For just as radical new theories are generally taken to be incommensurable with what went before, so new orders of society may arise that are regarded as incompatible with what they replaced. In such cases the whole of society is faced with a serious crisis that encompasses everything that was once held dear and is now judged to be irrelevant, improper, or even immoral. In discussing the change or order it is therefore important to ask if all changes in society must necessarily be so destructive and disorienting or if change can happen in a more creative way.”(Bohm, 1985)

Sooner than the social sciences the physical and biological sciences accepted that use of closed systems thinking exacted a knowledge price. Now we see where applying closed models to corporate reality also results in unfortunate consequences. Using the terminology proposed here, where communication between an entity and its environment is restricted, “cracks” appear. Cracks seem to appear in any entity that fails to adapt to a changing environment.

In moving from the world of production of tangible goods, as fixed entities, to the world of services as intangibility, we lose many of our traditional markers of reality. We leave a world of conceptual stability and entered a world that seems incomplete and indeterminate. In an incomplete world entities continually unfold, emerge, and become. We use the metaphor of “building the unfinished” as a way to organize new value and supply chains. This is very different from the metaphor of “recycling.” Products, as unfinished goods, would continually evolve along services to seek a nature that better fits in their context. This is another approach to understanding and managing service-based products.

In the current context of business there clearly are new activities and actors emerging but the same can be said about any era. What then is different in the current context? Perhaps it’s that the values that drive these actors and organize their activities are fundamentally different. The measures seem more ambiguous than those of size, profit, control and stability. Armed with traditional values, models, measures and principles we have trouble appreciating and understanding what is taking place in most society. This is seen most clearly in the arena of ICT. To be successful in computer engineering it is now better to have a degree based in biology than engineering. The changes are seen in the world of those designing and using the operating systems that run computers and ICT.

The distinction between industrial goods and services seems strangely related to Descartes’ mid-17th Century dramatic “body – mind” split, as seen in Descartes’ Sixth Meditation, “Of the existence of corporeal things and of the real distinctions between the mind and body of man.” (Lafleur, 1951). The meditation could also be used to describe the difference between the “tangibility of goods” and the “imagination of services.” This body-mind split may now be a major rationale that stands in the way of product development. The historic mind-body and the economic goods-services splits are counter-productive to understanding the potentials of the truly integrated sets. The holistic

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concept that this implies can itself raise many problems, but there are many opportunities for those that bother. The OS conception of Linux as a means to integrate societal parts illustrates some of this. It is even possible to speak of integration of many aspects of society that became segmented during industrialization.

Microsoft's operating system has long been seen as a platform for revolutionizing business systems that use it. Now it is beginning to be perceived as highly conservative, closed and essentially paranoid system. It is being attacked, and cracked, by several forces of change. The most controversial and perhaps effective forces of change are coming from the designers and user of the Linux OS. This exemplifies the value differences between old and new models of business. Clearly Bill Gates and Linus Torvald's have and exhibit different value systems. Both are key members of the sector called computer services that is reforming the industrial system, but has clearly moved further from industrial values. Just as the Microsoft OS has created cracks in traditional industrial systems, cracks are appearing in the Microsoft System. Linux is creating some of them, but what is this Linux system?

The Linux operating system for computers demonstrates how variety is essential, possible and interesting. Linux demonstrates the potentials in conceiving of products as open-ended in order to become a public-domain loci for innovation. In this way services can emerge from closed-system conceptions of industrial products, and their limited utility and life spans. They can become open-system phenomena that are always becoming.

It's as if human values have come full circle, to again confront the conditions of an intangible and ambiguous context, that which it tried to leave behind via industrialization. The challenges raised by this are becoming an important ingredient in the emerging service economy (Economist, 1999). The concept of services, and expanding on the service provision potential of relatively fixed products, provides a doorway into understanding the new economy. Services may not be at the center of this new economic model, but it provides better access than via traditional industrialized goods production. Services have many definitions. The American Marketing Association defines services as activities, benefits, or satisfactions, which are offered for sale, or provided in connection with the sale of goods (AMA, 1960). According to Kotler (Kotler, 1995), a service is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything. Its production may or may not be tied to a physical product. Our approach differs from this tradition. We, along with many of the firms with which we work, are looking at services as information management. Here we make distinction between MIS, which translates into how a system can be expanded to manage ever more information. It is essentially a quantity problem with quantitative measures of success. We are approaching information management as a means to limit the information that needs managing. This is essentially an issue of quality, distinction negotiation and seeking differences that inform in a way that makes a difference.

A service is a complicated phenomenon. Its meanings range from personal service to a service as a product. A machine, or almost any product, can be turned into a service if the seller makes efforts to tailor-make the solution to meet the most detailed demands of the

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customer (Gronroos, 1990). Depending on use, services can be similar to the definition used by the US Bureau of Economic Analysis. Or, services can be similar to the vague inferences seen in highly successful automobile and computer ads. Herein services are seen differently. They are soft subjects that occupy the informed shadows of material goods.

Products are traditionally viewed as consisting of given, pre-determined features. Services are traditionally seen as more dynamic and heterogeneous (Gronroos, 1990), as is shown in the following chart.

<i>Physical Goods</i>	<i>Services</i>
Tangible	Intangible
Homogeneous	Heterogeneous
Production and distribution separated from consumption	Production, distribution and consumption simultaneous processes
A thing	An activity or process
Core value provided in factory	Core value provided in buyer-seller interaction
Customers do not (normally) participate in the production process	Customers participate in production
Can be kept in stock	Cannot be kept in stock
Transfer of ownership	No transfer of ownership

Figure 1 - Industrial Characterizations of Services versus Goods (Gronroos, 1990)

The depth of reevaluation now underway by emerging businesses is very interesting. Some signs of it are presented in the brief section that follows. It appears to provide a good example of a new service product that meets the expectations of realizing “purposefully incomplete” service products. It may even be relevant to future goods production.

EMERGENCE OF AN ALTERNATIVE TO TRADITIONAL BUSINESS: A 21ST CENTURY FINNISH SAGA

A couple of years ago, it was found that Linux had problems with its e-mail system. These problems were communicated to a world-wide circle of hackers through the Internet. Five hours later, the problem was considered solved (Helsinki Sanomat). Ironically, Microsoft, with annual sales of 500 million dollars, cannot afford to hire sufficient personnel to develop a product that out-performs Linux. Most Microsoft’s customers do not yet need a high level of performance but this may in the future change. The following outlines why and how Linux responds to a different model.

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Linux is the story of a world-class operating system emerging from the part-time hacking efforts of several thousand program developers from all over the world, connected only by the Internet and a common interest. Millions of individuals and organizations currently use it as their computer operating system. This is perhaps seven per-cent of the market claimed by Microsoft but it is amazing that it even exists. Unlike other operating systems, Linux can be freely copied and distributed. The story of Linux illustrates the effectiveness of an open source approach to software development, and may also reflect fundamental changes in Western society. The shift may be from product-oriented industrial production towards the service component, and its flexibility, becoming more dominating.

The beginning of the Linux saga is 1991, when a 21 year-old Finnish student of computer sciences, Linus Torvalds, purchased his first computer. It was a PC with 4 Mbytes of RAM (Wired, 1997). Linus needed an operating system which could exploit the full potential of his computer, but soon found that the operating systems then available in the market were too costly or too low quality. As a result, Linus decided to develop his own alternative operating system. He decided to base it on the commercial Unix, which was then in wide use in university networks, and quite sophisticated as compared with MS DOS systems. The dilemma was that a Unix System then cost at least \$5,000 and he only had a couple of hundred to invest. He worked on the project for six months, during which he wrote the program for the kernel of the system, the keyboard and screen drivers. Linus felt that his operating system had some defects and decided to consult fellow hackers over the Internet by sending the following message to an international chat group:

*“Hello everybody out there using minix (a version of Unix).
I’m doing a (free) operating system. (just a hobby, won’t be big and professional like gnu) for 386(486) AT clones. This has been brewing since April, and is starting to get ready. I’d like any feedback on things people like/dislike in minix, as my OS resembles it somewhat.”*

Many showed their interest in Linus’ work. Soon he was able to release the first kernel of Linux (the core of the operating system) under the GNU’s Public License on an FTP site (Kauppinen, 1999, and 1995). After letting others work on Linux, Linus Torvalds focused on coordination of the collective effort. By January of 1992, over 100 users had downloaded Linux and were regularly updating the source code with new fixes, device drivers, etc. During the past decade, a new update of Linux has been released approximately every third week. Early and frequent releases enabled the fast elimination of bugs, and the expansion of potential user applications of Linux (Torvalds, 1995). Ideas and prototype codes are often rewritten three or four times before reaching their stable final form. Customers have been able to choose between the “older”, stable (bug-free) version and a brand-new, yet untested, version of Linux (Erkkila, 1999).

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The first official Linux version was released in 1994. At that time, the users of Linux were mainly Unix hackers and net activists. Linux started to gain popularity among the people not familiar with the Internet. The Linux operating system then came to be distributed by Red Hat Inc. in 1995 (Aasarmoen, 1999, Shipley, 1999, and Palojarvi, 1999). Red Hat, as well as other distributors, does not actually sell the software, but contributes to its value-adding process by assembling and testing a running Linux operating system in a form they can warrant as merchantable and plug-compatible with other operating systems under the same brand label (Mediautiset, 1999). Originally, Linux was used to solve esoteric tasks in a hurry. From there, it grew into applications for house printing systems, to support custom manufacturing systems, for performing traffic graphing and analysis, for supporting custom intranet applications, and even to function as a platform for Web and e-mail gateways. It contains all the features you would expect in an operating system, such as true multitasking and virtual memory. It also has the world's fastest TCP/IP drivers, shared libraries and multi-user capabilities (Pravica, 1999).

Science and engineering related industries have begun replacing high-end Unix clusters with inexpensive but computationally superior Linux clusters (www.opensource.org, 1999). Examples include NASA and the Oak Ridge National Library (www.opensource.org, 1999). With 12,000,000 users in 1998, Linux is gaining a wide market acceptance, including use as a business server (Mattila, 1996). Over the past twelve months, we have witnessed Apple, Compaq, Corel, Dell, Hewlett-Packard, IBM, Intel, and Lotus launch support for Linux, just to name a few examples (Littman, 1999). Linux's share of the server market grew by 212% during 1998, which makes it the world's fastest growing operating system, and the only viable alternative to the Microsoft Windows operating system (Littman, 1999, www.opensource.org, 1999). IBM announced in December, 1999 that in 2000 it would embrace Linux as the core of its future service activities. They would develop future software and corporate operating systems to primarily utilize the advantages of Linux.

Many of the users are not only impressed by the free status of Linux, but by its leading-edge stability, security, performance and interoperability (Pravica, 1999). Customers also appreciate Linux, because they can build their own applications on it. As compared to task-oriented Windows and Mac Operating System, Linux is technology-oriented. The disadvantages of Linux lie in poor marketing and the lack of customer and equipment support. Some customers hesitate adopting an operating system where there is ambiguity about its operational responsibility. Linux exemplifies the ideal of a 21st Century new services model we have advocated - "the furnishing of unfinished products," or more simply, "the architecture of the unfinished." Treating customers as co-developers is a route to rapid code improvement and effective debugging (Sibley, 1999). As compared to commercial, proprietary Unix, minor updates of Linux are released almost every day. It can take months before bugs are fixed in the commercial Unix (www.tuxedo.org, 1999, Sibley, 1999). Seven attributes of Linux point to possible characteristics of new services in a new economy. These are outlined in the following.

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IMPLICATIONS OF THE LINUX MODEL FOR FUTURE SERVICE SYSTEMS

1. Linux stresses continuous product development, an important characteristic to operating with the fluid state of the service economy. Microsoft and other software houses adopting the proprietary approach can be compared to 1950s car manufacturers in the United States where manufacturers compete to introduce a new model to the market every year. In a similar vein, you have a new version of Windows every year that differs somewhat from the previous year's model. Each new model is marketed as fixed, boxed and "finished." Linux is different, in that it continually flows towards via changing qualities and continuous improvements (www.tuxedo.org, 1999). Both MSDOS and OS Linux are brought to customers when they sort of work, yet are known to be imperfect. MSDOS customers must wait for repairs in a new version that will be fixed, boxed and released. Continual reiterations from rapid customer feedback modify OS Linux to provide new features that its consumers need and want. Linux is much more consistent with a fluid environment.

2. The open source code can be copied, shared, and altered without anyone's permission. All the derivative work is freely hackable (Glasner, 1999). The blending of free OS software sourcecode into products with commercial applications creates opportunities and efficiencies that are unknown and unprecedented. Providing the source code along with applications enables a company's customers to create their own applications (www.opensource.org, 1999). As such, the Linux approach leads to increased customization and customer satisfaction. In his famous essay "The Cathedral and the Bazaar"(Moody, 1997), Eric Raymond compares the proprietary and open source development to design and building of a cathedral and a bazaar. The cathedral approach is more fixed to begin with and becomes ever more solid with time. The bazaar style is Linus Torvald's style. This means releasing early, delegating everything you can and being open to the point of promiscuity. The bazaar style requires dealing with the ambiguities of different agendas and approaches. There are arguments for both, but the Linux approach is better in a non-catholic environment of high change.

3. The lack of traditional organizational structure, e.g., hierarchy, associated with the open source path to development can be daunting for someone used to the traditions of the 19th Century bureaucratic and 20th Century corporate worlds. Within the open source philosophy, the work gets done when it gets done. There are no arbitrary deadlines or obligations. Those who work within its realm are driven by love, not money (Wendisch, 1999). Such a "system" might however imply a reduced concern for quality and a highly fragile product. In fact Linux is known for being robust and of exceptional quality, in contrast to its competitors. This has been explained by the way in which the open-source hackers self-organize themselves into a flow that results in maximum productivity allowed by a modified form of self-selection – where the social milieu ruthlessly seeks the highest competence (Moody, 1997). For most hackers, the goal is to create neat routines, tight chunks of code, or cool "apps," all of which are to earn the respect of their peers. In essence, open software is continually "peer-reviewed." Thus it is improved by those most concerned with its improvement. It becomes a self-selecting, self-organizing,

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self-managing process. It is often more reliable than closed, proprietary software (Wendisch, 1999).

4. Although the emergence of the open source movement may in part be explained as a “gift-culture” kind of behavior, it is actually more inclusive. The Linux system highlights the increasing importance of the flow provided by the service component and lowers the need for the solid aspects of the product component. Both are present the industrial economy balance between the two is strongly shifted to the fluid advantages of the service side. Today, more and more companies are providing their source code as a part of the package they sell or by making it available to anyone on the Internet. Examples include Nethack, Emacs VC and GUD modes, and Xlife and Netscape Communicator. Even Microsoft is considering opening up its source code for use in some parts of its newer systems. Many of these companies share the common feature that the main link to customers and value in the product comes not from the software itself but from its service and integration aspects.

5. Ethical and political aspects have always been important characteristics to consider in understanding the culture of any OS movement. Linux has struck a special cord in the system of human needs and has attracted special types of followers. It has become especially popular at the fringe of developed countries that are a major source of innovation and in the center of developing countries that are taking their first steps towards adopting the Information Society. Its free status is a real plus for both locations. Linux system also promotes growth of small and medium sized companies in both contexts which arise to provide customer support to Linux users.

6. Open source alternatives seem to prevent customers from being locked-into a supplier-controlled monopoly. It is easy to switch between the various service offerings that surround the open source.

7. Last, but by no means unimportant to the new economy, Linux is simply entertaining. This is due to aspects of the above six attributes, as well as fun to use. It also makes use of what has come to be called the IKEA advantage. By getting customers involved in the transporting and making of the product you tap into other human motives and emotions about how the product relates to their life-space.

Linux is one of many developments that illustrates the emergence of a highly fluid society in the 21st Century. Now we need to identify management metaphors, models and measures that can help effectively support this development, not ignore or fight it.

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