Knowledge Economics role in explaining growth and innovation

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Knowledge Economics Role in Explaining Growth and Innovation

Abstract: This paper is written to show that there is a definite model that has been developed that explains the role of innovation to economic growth. This paper is based on the theorem that was built up in the paper that I wrote in 2007 entitled "Point X and the Economics of Knowledge", as well as the so far unpublished papers concerning the long and short term properties of knowledge. This paper shall us the short term properties of knowledge to explain the relationship between growth and Knowledge. Stuart Kauffman of the university of Calgary believes that "Conventional economic theories about growth and the evolution of future wealth may be inadequate. We need a theory and historical examination of the growth of the actual economic web and of whether, in a supracritical economy, a sufficiently high diversity of the web autocatalytically drives its own growth. Furthermore, we need to understand the mutually and collectively cross-enhancing power of complementary technologies, regulatory structure and attraction of consumers in the creation of wealth." I say this is wrong, the paper "Point X and the Economics of Knowledge", gives an excellent framework to answer these questions. This paper will delve to be as simple as possible.

On May 9 2008, Stuart Kauffman of scientific America magazine wrote an insightful piece on their website entitled "The Evolving Web of Future Wealth", questioning how much economics basically know about the knowledge process as a whole, how does economics explain innovation. These questions were basically answered in the papers "Point X and the Economics of Knowledge", as well as the paper, "The Fundamental Theory of Knowledge".

When a material is discovered there are n potential uses. Once discovered the most basic uses of that material are the uses first discovered then as more is understood about the material more and more uses come out. There are no more than n uses, this concept is shown below in figure 1.

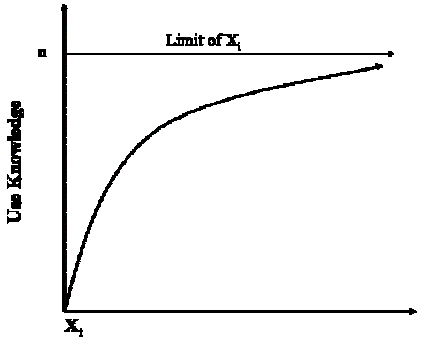

Fig 1

This paper is not about explaining the intricacies of figure 1, that is explained in a paper to be entitled, "the short and long term behavior of knowledge", but figure 1 illustrates the short term behavior of knowledge. In the short term knowledge has a limit, and for the material represented by X_i that limit is n uses. Obviously these uses are not all discovered at the same time. For interests sakes the short term properties of knowledge are defined by the relationship $U = f(\ln X_i, Yu)$, where by:
Xi represents the laws of Knowledge
And Yu is defined as
$Yu = f(Y_{t-1}, X1 \ldots X6) + Ka$ where
Y = Total Knowledge of a society
Y_{t-1} = Total knowledge of a society in the last time period
X_1 = economic freedom
X_2 = Conversion rate, (the rate of turning theoretical knowledge into use knowledge, i.e goods and services)
X_3 = Academic Freedom
X_4 = Research (private and government)
X_5 = Difference between outside knowledge and knowledge a society has
X_6 = Literacy rate
Ka = Basic knowledge needed for an adult to survive

$du/dx > 0$

Do not confuse the X with point X that represents appoint of knowledge, see paper "Point X and the Economics of Knowledge".

Assume that the material in figure 1 is zinc. Assume now another material is discovered, say copper, the chronological order is not important what came first iron or copper, that is for anthropologists, we are dealing with economic issues. With the discovery of copper suddenly the potential for goods jumps because we can say there are n uses of copper, but there is also now the opportunity of mixing copper with zinc to get brass. Remembering from knowledge theory that each point of knowledge is independent we can say that there are n uses for brass. Brass has properties unique to brass making it a different material from either zinc or copper. The laws of existence say if you mix so much copper with so much brass you get

brass, this law exists even if people do not discover brass, but though independent of copper and zinc, one can not derive brass without first discovering zinc and copper. It is here that Kauffman shows a critical misunderstanding of the knowledge process "Here is a simple example. Had a firm invested vast sums of money in 1910 to invent the television remote control—many years before the invention of the television, multiple channels, substantial programming and a substantial viewing audience—the TV remote would not have fit into any niche in the existing economic web. The invention would have been useless and unprofitable; it would have propelled neither investment nor the creation of wealth." why would anybody invent a TV remote in 1910, before a television was invented, as I have repeated often in my papers, goods are generally derived, either from a law or other goods, this is aptly demonstrated in the paper, "Knowledge Theory and Investment: Enhanced Investment Decision Based on the Properties of Point X". When risk was been discussed there was a table 2 and table two in that paper is identical to table 1 in this paper.

	Type of Research	Risk	Type of Investor	Priority for Private Investment
1	$X_i \longrightarrow X_{i+1}$	Highest	Government, Foundations, higher education	least
2	$X_i \longrightarrow U_i$	Middle	Same as above, as well as private	Some
3	$U_i \longrightarrow U_{i+1}$	Lowest	Private	Highest

Table 1

From table 2 it can be clearly seen that the highest risk investment is X_i to X_{i+1}, this kind of research usually takes place in universities and government. This research in itself does not immediately lead to use hence its risk. The least riskiest type of research involves U_i to U_{i+1}, I argue in that paper this is research best undertaken by private sector, the improvement of goods and the deriving of other goods, the reason is because it is the least risky type of research, results are quicker and more certain to come by. A remote control would be derived from a television it can not be the other way round because a television remote has no function without the television, whilst the television has function without a television remote control. However this paper is not dealing with investment but rather with types of research to illustrate knowledge processes.

Returning to the discovery of copper and now the possibility of creating brass, we have a new knowledge function as illustrated in figure 2.

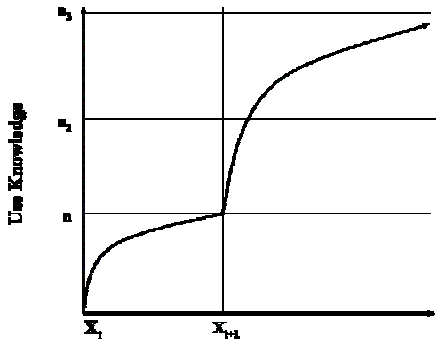

Fig 2

In figure 2 X_i is the discovery of zinc, point X_{i+1} represents the discovery of copper. At the discovery of copper an interesting phenomenon occurs, there is a new surge in the potential, but the old function defining X_i becomes obsolete. The new function is that described by that defining the new discovery copper. Recalling from the paper "point X and the economics of knowledge" point X at its most basic just represents a single law of existence, the lowest indivisible knowl, knowl been a unit of knowledge that was first mentioned in the book "The Fundamental Theory of Knowledge", a unit of knowledge was needed so that it would be easier to understand knowledge and find a practical method for measuring knowledge, that way knowledge needed its own unit just as mass has its own measure, distance has its own measure, temperature has its own units and the unit for knowledge is knowl. At its most complex point X is to know everything, at this stage all phenomenon becomes timeless, the concept of timelessness has been discussed in the paper "Point X and the Economics of Knowledge".

Looking at figure 2, X_{i+1} contains the knowledge that was known from point X_i, point X_{i+1} is a larger point of knowledge as described in the referenced papers, this is why the previous function defining Xi becomes obsolete.

Note what is happening, with the discovery of iron people could find a living mining the zinc, others using the zinc to make goods, this fosters exchange because these people will sell their products. With the discovery of copper, that takes innovation, then now with new uses that are different from zinc, people will be employed to mine copper, others will find a living by creating products from the copper. But now a bright spark realizes you can mix zinc and copper to get brass, bringing a whole new material that has its own uses, this itself is innovation realizing that zinc and copper can be mixed to make an alloy called brass. Now there are more people employed.

A theory must be consistent, goods and services become obsolete. Therefore in theory if we say there are n potential uses for zinc, therefore n potential uses for copper and n potential uses for brass, we would expect to end up with 3n potential uses when once copper is discovered. But this can never be the case because of the fact that goods become obsolete, hence in figure 2 we have n3 notation rather than 3n and $3n > n_3 > n$. There are thousands of goods that have become obsolete in the cause of human history, the mode of production and consumption is ever changing.

Just for interests sake the function for knowledge after X_{i+1} has been discovered is exactly the same as the function that defines knowledge before X_{i+1} is discovered, that is to say the function now becomes:
$U = f(\ln X_{i+1}, Yu)$
And when a new materials is discovered the above function becomes obsolete and the new function becomes:
$U = f(\ln X_{i+2}, Yu)$ and so on. That is why this function is termed the short term function of knowledge. The Yu determines the systems potential of a society, systems potential just determines how much knowledge can the society extract, not for this paper. Again not for this paper but for interest's sake the long term function of knowledge is:
$U = f(e^x, Yu)$.

What Is Occurring

An interesting point was made by Kauffman and his co – authors his article for scientific America, "The Evolving Web of Future Wealth", "Some real-world economies appear to be subcritical. Joseph E. Stiglitz of Columbia University describes one African nation whose major economy consists only of diamond and cattle exports. One of us (Kauffman) lives in Alberta, Canada, which exports shale oil, animal and forest products, and has an information technology industry correlated with the oil industry. These two economies appear to be subcritical: they do not seem to be creating an ever growing and changing diversity of goods and services complement and substitute for one another. By contrast, the U.S. economy, the European economy, the global economy and perhaps other national and regional economies appear to be supracritical, creating an ever changing spectrum of novel goods and services." Clearly from this statement there is no grasp of how the knowledge cycle truly works, for this economists are to blame in some sense, I thought it was obvious but for clarities sake let us look at figure 3.

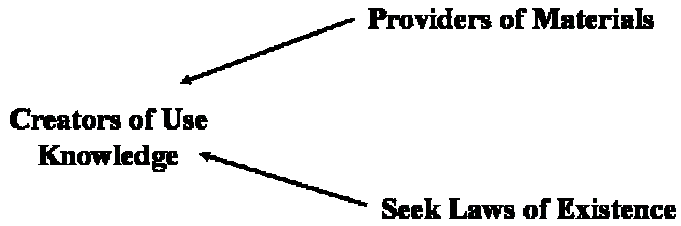

Fig 3

Figure 3 illustrates a simplified process of what is going on in an economy, or should one say in a society. There are those who seek knew laws of existence, these are the pure researchers shown by 1 in table 1. These people are the ones who discover new laws of the material, be it biology, chemistry, physics, psychology, economics, these people discover new laws of the material, they seek laws of existence.

Those who create use knowledge do so because they have the laws provided to them by those who actively seek laws of existence and there are those who provide the materials. Countries like Botswana, South Africa, Saudi Arabia will fall into the category providers of material as a society. A country like Canada, Russia, USA and China are societies that can be considered total, they have providers of material, those who seek laws of existence and most importantly the creative aspect, those who create use knowledge, those who turn point X into a point U. Obviously a country would benefit more if it also considered not merely providing resources but participating in the whole knowledge cycle, seeking laws as well as creating a point U, use knowledge. Those who create a point U need materials, without materials there can be no creation of goods.

One could argue that diamonds have no use, but they do, biology has made human eyes be attracted by something shiny and it seems people are willing to pay a high price for something shiny.

In Conclusion

Competition it is agreed is a spur for innovation, I hope that this paper has demonstrated a simple fact how innovation spurs growth, a new innovation if successful, if people desire it will result in people being employed, that simple fact can not be argued. But one must consider the mode of production, it might be cheaper to do it elsewhere. But in the long run, the world as a whole benefits, those who desire to participate in the global economy. Innovation in the West and Japan leads to a desire for more materials. Total competition will occur when all societies understand the importance of knowledge, then no doubt we might a see a golden age for the entire world.

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