

**THE KNOWLEDGE ACCELERATING THE SOCIETY  
DEVELOPMENT**

Jaroslav ŠMÍD, Peter SAKÁL

**Abstract**

*The formation of appropriate conditions can accelerate the society development. According to the existing definitions, the society can be viewed as mankind as a whole, or a state, a region or a group of businessmen. This paper extends and supplements of the contribution [1]. It deals with the knowledge accelerating the society development using the modified formal notation of the society development according to [2].*

*The open innovation concept [3] presents the intentional use of external knowledge flow. This paper deals with the intentional use of knowledge in time.*

**Key words**

*society development, pyramid of knowledge, knowledge*

**Pyramid of knowledge**

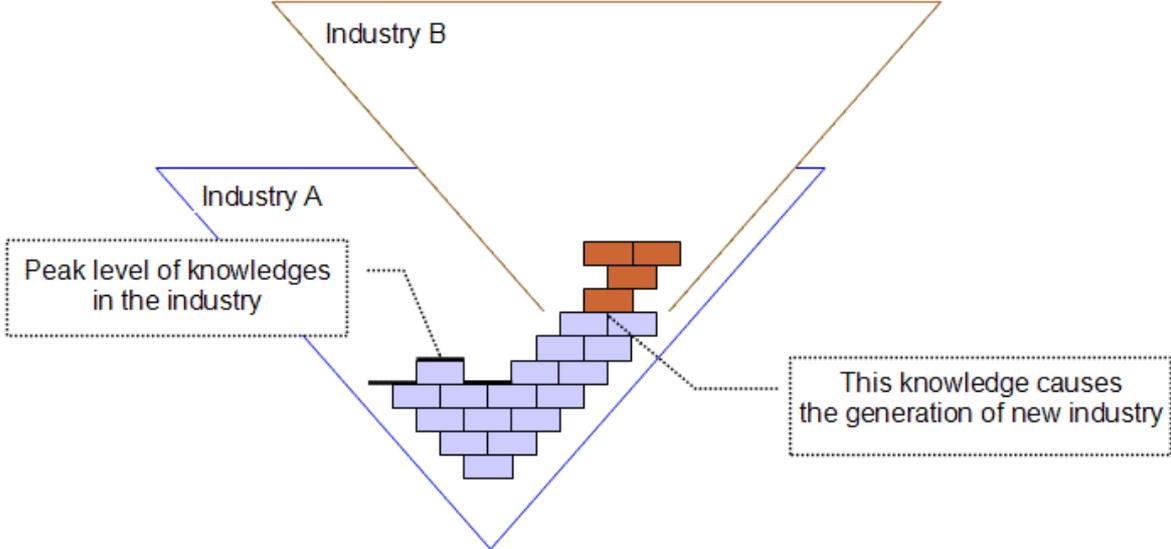
Every branch accumulates certain amount of knowledge. Figure 1 shows the knowledge model using a pyramid. Every building unit in the pyramid shows the single knowledge. The units at the top of the pyramid present the top level of knowledge. Every unit was at certain time placed at the top and presented the top level of knowledge. The pyramid develops in real time in such a way, that every unit with the human invention generates the new knowledge, which becomes the new top knowledge [1].

Some knowledge, progressive knowledge, is so important, that a new branch appears or the development transfers rapidly [1].

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The pyramid of knowledge can be visualized as a multidimensional one - some knowledge is a part of pyramids of knowledge from several branches. It can be marked as section knowledge. Any progress and the new knowledge which can be used in various fields influences the development of various fields at the same time, thus accelerating the society development more than the knowledge acquired and used in one field [1].



**Fig. 1** Pyramid of knowledge

Source: Accelerating the society development level of innovation and pyramidal knowledge [1]

**Society development model**

The branch (discipline) is symbolically denoted  $D_i$   $\{i=1,m\}$ , where  $m$  is the number of branches, e.g. Engineering  $D_1$ , Electrotechnics  $D_2$ . The single knowledge is denoted by the symbol  $V$ . The time order of the single knowledge acquiring in single branches can be expressed by the following notation:

$D_1$	Electrotechnics	$V_{1,1}$	$V_{1,2}$	$V_{1,3}$	...	$V_{1,k1}$
$D_2$	Engineering	$V_{2,1}$	$V_{2,2}$	$V_{2,3}$	...	$V_{2,k2}$

The knowledge  $V_{1,k1}$  represents the top knowledge level in the branch  $D_1$ , the knowledge  $V_{2,k2}$  represents the top knowledge level in the branch  $D_2$ . According to the model - Pyramid of knowledge, the acquired knowledge with the prior branch knowledge generates the new knowledge.

The new knowledge formation is not only caused by the previous knowledge from a given area and by the invention expressed by the knowledge growth coefficient. It is caused as well by the knowledge from the nearest related branches.

The society development can be expressed as a gradual knowledge acquiring from different branches in time. The society development can be generally expressed by the following notation:

$D_1$	$V_{1,1}$	$V_{1,2}$	$V_{1,3}$	$V_{1,4}$	$V_{1,5}$	...	$V_{1,k1}$
$D_2$		$V_{2,2}$	$V_{2,3}$	$V_{2,4}$	$V_{2,5}$	...	$V_{2,k2}$
...							
$D_m$			$V_{m,3}$	$V_{m,4}$	$V_{m,5}$	...	$V_{m,k3}$

Branches  $D_2$  a  $D_m$  emerged later than the branch  $D_1$ . This is the reason why the knowledge  $V_{2,1}$   $V_{m,1}$   $V_{m,2}$  does not exist. The first knowledge in the branch  $D_2$  is  $V_{2,2}$ . The branch  $D_m$  emerged as the last and its first knowledge is  $V_{m,3}$ .

Apart from the common society development by the gradual knowledge acquiring, the special knowledge occurrence could come into existence:

- knowledge, which was ahead of the society development,
- knowledge, which influences the development of various branches,
- knowledge, which broadens the existing branch or gives rise to a new branch.

**Knowledge, which was ahead of the society development**

The society development presents knowledge, which was ahead of its time and which will be used in the future. A typical example is the binary system use. M. Leibnitz was the first person, who introduced the binary system and its use in the year 1703 [5]. The binary system was practically used later in the computing technology though. It is the knowledge, which does not appear to be ahead of the society development in the time of discovery. It appears to be the knowledge, which does not have a practical use. It was necessary to acquire deep knowledge from other branches to find the practical use of the binary system.

$D_1$	$V_{1,1}$	$V_{1,2}$	$V_{1,3}$	$V_{1,4}$			
$D_2$		$V_{2,2}$	$V_{2,3}$				$V_{2,4}$
...							
$D_m$			$V_{m,3}$	$V_{m,4}$			

$P_{2,4}$  is the knowledge, which was ahead of its time in the branch 2.

This knowledge causes to reinvent the knowledge in its branch and other branches acceleratingly.

$D_1$	$V_{1,1}$	$V_{1,2}$	$V_{1,3}$	$V_{1,4}$	$V_{1,5}$		
$D_2$		$V_{2,2}$	$V_{2,3}$		$V_{2,5}$		$V_{2,4}$
...							
$D_m$			$V_{m,3}$	$V_{m,4}$	$V_{m,5}$		

The binary system use as well, which was not of any practical use in its time, accelerated the society development. The development in certain period, which considers using two states of data transmission and processing, was accelerated by the existing knowledge of the binary system and basic mathematic operations, which were run in this system. The extent to which the knowledge accelerated the society development was in this case low though.

To use this knowledge to accelerate the knowledge, it is necessary to preserve and develop it for future and search for and use the knowledge from the past.

### Knowledge, which influences the development of various branches

The electronic microscope, which enables studying the materials on the atomic level, opened up new development possibilities of all branches. It enables to observe the surface of materials and manipulate single atoms and molecules, which facilitates research of new areas for example nanotechnology.

$D_1$	$V_{1,1}$	$V_{1,2}$	$V_{1,3}$	$V_{1,4}$	$V_{1,5}$		
$D_2$		$V_{2,2}$	$V_{2,3}$	$V_{2,4}$	$V_{2,5}$		
...							
$D_m$			$V_{m,3}$	$V_{m,4}$	$V_{m,5}$		

The knowledge  $V_{2,4}$  is the section knowledge and influenced and accelerated the development of different braches.

### Knowledge, which broadens the existing branch or gives rise to a new branch

The most precious knowledge is such, which causes to broaden the boundaries of the existing branch or gives rise to a new branch.

$D_1$	$V_{1,1}$	$V_{1,2}$	$V_{1,3}$	$V_{1,4}$	$V_{1,5}$		
$D_2$		$V_{2,2}$	$V_{2,3}$	$V_{2,4}$	$V_{2,5}$		
...							
$D_m$			$V_{m,3}$	$V_{m,4}$	$V_{m,5}$		
$D_{m+1}$					$V_{m+1,5}$		

A good example could be the laser discovery and development, which helped to broaden boundaries of many branches.

### Conclusion

It is possible to generalize this concept and to a certain level consider every knowledge to be the knowledge, which:

- was ahead of its time and retrospectively accelerates the society development,
- influences the development of various branches,
- broadens boundaries of the existing branch or causes a new branch creation

The knowledge, which has these qualities, can be considered the knowledge which accelerates the society development.

In the sense of this and previous papers, it is necessary:

- to support the knowledge, which influences the development of various branches or gives rise to a new branch, supports cooperation between branches, supports technologies development, new materials, measurement methods and other section areas.
- to preserve or develop the knowledge which does not at present have any commercial use and to search for the existing knowledge, which in the past was not commercially used.

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