

# **An Analysis of Nobel Prize for World Science (1901-2007): Physics, Chemistry and Physiology/Medicine**

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## **Abstract:**

The paper presents an analytical study of the Nobel Prize given for the last 107 years since its inception in 1901. A general trend in the subject areas of Physics, Chemistry and Medicine, in regard to the shift in individual benefit to collaborative benefit in Nobel Prize is attempted. In doing so an attempt has been made to show the sharing has emerged in awards. This is reflected in three time eras i.e. Pre World War period; Between World War I and World War II; and Post World War II period. In these periods a study of the beneficiary nations in the three field of science i.e. Physics, Chemistry and Medicine. The Sweden based Nobel Foundation has for a century been awarding prizes for outstanding work in Physics, Chemistry, Economics, Physiology/Medicine, Literature and Peace. The Nobel Prizes however much they represent, the best of the best in their field, also represent another kind of achievement: they are forces for science, culture, policy, public opinion and even politics. The first Nobel

Prize in Chemistry and Medicine have been analyzed to have perspective opinion of the state of the art. The study reveals that European nations that were dominating the Noble Prize awards in the pre World War period have been sidelined. The trend is visible in all fields of science. The post War period saw the emergence of USA and its allied forces. This also could be as result of migration of intellectuals from Europe, Asia Africa and other continents to USA which needs further exploration.

**Key Words:** Nobel Prize, Trend analysis,

## **Intorduction:**

Prizes were awarded in 1901 to carry out the final wishes of Swedish chemist and inventor Alfred Nobel, who as per his wish wanted to recognize people whose work conferred “the greatest benefit on mankind”. The annual awards in the sciences, literature and the promotion of international peace are among the most prestigious in the world.

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It is strange that Nobel Prize awarded for the past more than 105 years since its inception in 1901, went unnoticed without any fanfare on completing 100 years. In this context this paper presents an analytical study of the Sweden based Nobel Foundation for outstanding work in Physics, Chemistry, Physiology/Medicine.

The first distributions of prizes were made on Dec 10, 1901, the fifth anniversary of the death of Nobel. The Nobel Prizes for physics, chemistry, and physiology or medicine have generally been the least controversial, while those for literature and peace have, by their very nature, been the most exposed to critical differences. The prize initially consists of a medal, personal diploma, and prize amount of 150,782 Swedish Crown initially in 1901 which now has been raised to a sum of 10,000,000 Swedish Crown in 2004. The festival day of the Nobel Foundation is on the 10th of December, the anniversary of the death of the testator. A Nobel Prize is either given entirely to one person, divided equally between two person, or shared by three persons

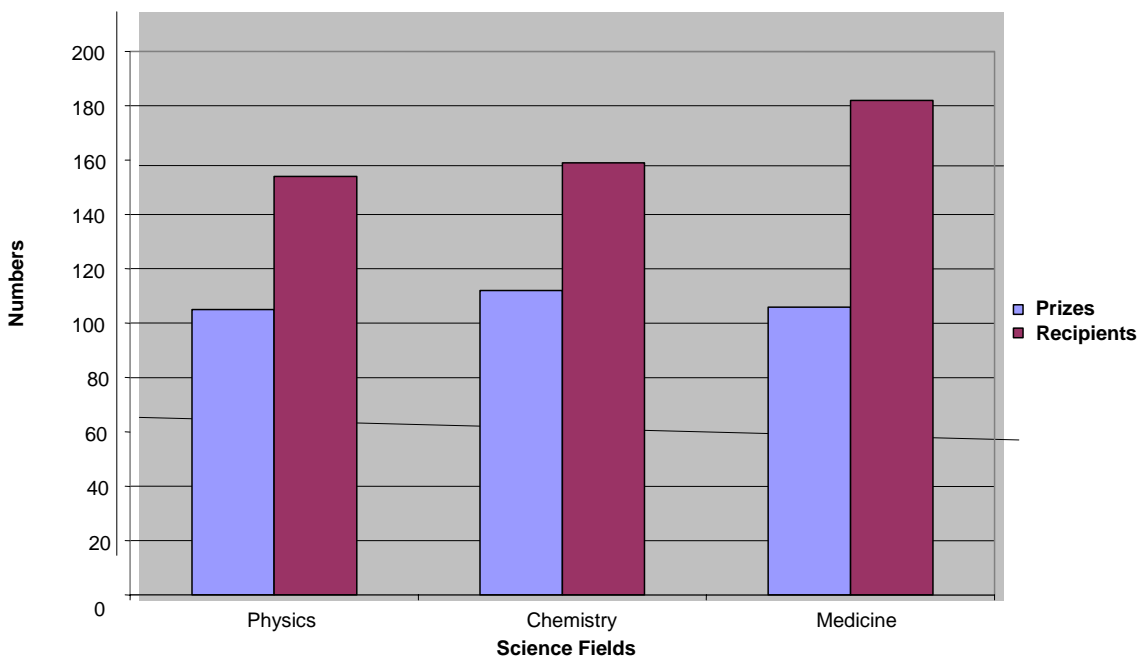
The paper presents an analytical study of the general trend of awards in the subject areas of Physics, Chemistry and Medicine, for the period of 1901-2007 along with the shift in individual benefit to collaborative benefit in Nobel Prize. In doing so an attempt has been made to show the sharing has emerged in awards. This is reflected in three periods i.e. Pre World War period; Between World War I and World War II; and Post World War II period. In these periods a study of the beneficiary nations in the three field of science i.e. Physics, Chemistry and Medicine have been analyzed. It is understood that organizations in which the

recipients belong have a major role in the development of World Science. Hence we have classified the recipient's affiliations in three categories namely: Universities /Colleges; institutes; and Industry and studied the contribution of these organizations. The aim of the study is "Who have benefited and have not, from the Nobel Prize" our analyses may provide valuable lead. The study reveals that European nations that were dominating the Noble Prize awards in the pre World War period have been sidelined. The trend is visible in all the fields of science. The post War period saw the emergence of USA and its allied forces. This shift could also be as result of migration of intellectuals from Europe, Asia, Africa and other continents to USA during and after World War II, which needs further exploration. The data for the present study have been collected from the site of Nobel Prize (Nobelprize.org), for each subject, under the analysis chronologically. Each and every entry under Nobel laureates has been downloaded individually. Later on the data has been converted in a suitable format for analysis. For each subject area same exercise has been repeated individually. Nobel prizes in the three subject areas namely Physics, Chemistry and Medicine have been analyzed. In all 332 Nobel Prizes in Science disciplines were awarded since its inception till today (1901 - 2007). These awards were shared by 514 eminent scholars and researchers from different countries.

Since its inception in 1901, during the span of 107 years Nobel Prizes were not awarded to individuals in the field of Physics, Chemistry and Medicine in the following years:

- Physics: 1916, 1931, 1934, 1940-42;
- Chemistry: 1916-17, 1919, 1924, 1933, 1940-42;
- Medicine: 1921, 1915-18, 1921, 1925, 1940-42

In these years the award was given to institutions as it seems the World was razed by the two World Wars.



**Figure 1: Distribution of Noble Prizes in all the Three Fields (1901-2007)**

In all the fields of Science in which the Nobel Prizes are awarded the Universities/ Colleges have played a major role in the recipient’s advancement in the three fields of science. It could also be assumed that the universities from Germany during the period of World War I & II were of high standards as compared to UK and USA. Also in this period not many research institutes were there. But in the post

World War periods a stream of Universities in USA and UK were seen fostering research in the three major fields of science. New institutes emerged fostering new areas of research in all the fields of science. As a result most of the recipients of Nobel Prizes were from Universities followed by research institutes.

**Table 1: Organizational Distribution of Nobel Prize in Physics, Chemistry & Medicine (1901-2007)**

Organizations	Before World War I (%)			Between World War I & II (%)			After World War II (%)		
	Physics	Chem.	Medicine	Physics	Chem.	Medicine	Physics	Chemistry	Medicine
1 <b>University/Colleges</b>	88	87	56	0	60	76	12	66	56
2 <b>Institutes</b>	82	11	44	15	40	24	3	34	41
3 <b>Industry</b>	60	2	0	33	0		7	0	3

**Table 2: Number of Recipient in different Time Periods in Physics, Chemistry & Medicine (1901 - 2007)**

	Time Period	One Recipient (%)			≤ 2 Recipients (%)		
		Physics	Chem.	Medicine	Physics	Chem.	Medicine
1	1901-1913	73	77	69	27	23	31
2	1914-1945	70	32	68	30	26	68
3	1946-2004	29	38	18	71	62	82

The inference that can be drawn from this analysis is that in the two World War (1901-13 & 1914-45) periods the individual recipients received the awards. Individualistic research was dominated in this period like research by Marie Curie, Ronald Ross, etc. During 1901-13, (Physics) 73%; (Chemistry) 77%, and (Medicine) 69% single recipient of Nobel Prize awardees were there, while in the period 1946-2007 the number was (Physics) 29%, (Chemistry) 38%, and (Medicine) 18% were single recipient. In 1901-13 in Physics 27%; Chemistry 23%, Medicine 31% were ≤ 2 recipient of Nobel Prize awardees. While in the period 1946-2007, the number was, in Physics 71%, Chemistry 62%, and Medicine 82% for ≤ 2 recipients. The same trend was observed in all the field of sciences in

which the awards are given. The recipients may belong to the same department, institution or country. They may be placed in different departments (interdisciplinary research); different institution (institutional collaboration) or different countries (international collaboration). The linkages among the recipients are another field of study that needs some exploration. Though Nobel in his will kept no fixed number for the recipient for the award and no boundaries among nations but the table shows that the trend is to give awards to more than two or the maximum three scholars in all fields of science. It confirms that science is moving towards more and more interdisciplinary and collaborative research.

### Key Findings of the Study

1. The analysis has indicated that during pre world war era in all fields of science Germany has the supremacy followed by France & Netherlands. United Kingdom was the next, USA was way behind.
2. In all fields of sciences during the period of 1914-45, other countries have also made their presence like Canada, Denmark, India, Italy, and Sweden. But, still the major share was with European countries, *eg* UK, Denmark and Germany. USA was also catching up. But in post war era, USA came as a superpower in research arena, and most of the total Nobel prizes were bagged by the American institutions.
3. An analysis has also been done to explore the type of organizations involved in research activities leading to Nobel Prize. It seems major share went to Universities in all the 3 eras. But the study reveals that, gradually the research institutions and industries have also joined in. In post war era, Universities came down; where as research institutes became more visible with an increase, more than two folds.
4. The trend of more than one person getting the prize also increased with the passage of time. In earlier years, recipients of individuals were more, where as later on it changed from 27% (1901-13) to 71% (1946-07)- Physics; 23 % to 62%- Chemistry and 31% to 82% in Medicine. The analysis indicated that more & more people

were coming together and sharing the prize money over the years.

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