Investigating through ISI Papers Published in Iran and Their Qualities Using Dynamic Approach

Hessam Kazari, Shahab Poshtkoohi, Ali Hasanpour

***Abstract*-- Promotion of faculty members in Iranian universities is mainly dependent on published ISI papers. Faculty members as the most important part of production of science, have strong motivation for making and publishing this kind of papers. In the other hand, produced science should satisfy scientific needs of industry and lead to both industrial and economic growth. But publishing this kind of papers and industrial growth have not the same aims and most of published papers have least relevance to industrial needs and so they are worthless. Because of the easier and faster procedure of producing these papers, there is a great tendency to publish this kind of papers, whereas there will not be enough tendency to publish the papers that can directly (or indirectly) affect industrial growth process. In this paper the effective parameters in producing some main kinds of ISI papers and influences of them in improvement of industrial situation of the country will be investigated, and afterwards continuance of this trend will be discussed. At the end, some policies are suggested to improve the quality of the papers and their benefits for industrial purposes.**

Index Terms—ISI papers, faculty upgrade policy, Industrial growth.

I. Introduction

In industrialized countries, science supply the industrial needs and papers that have no benefit for value added are rarely published. So there is a logical balance between producing scientific papers and industrial needs. But in Iran, because industry have not reached to a desired point of growth, there is no balance between publishing papers and industrial needs and most of published papers have no relation to Iran's industrial needs. On the other hand one of the most important factors for promotion of faculty members is the number of the published ISI papers. So in current situation, faculty members have a tendency to publish papers which are easier and faster to prepare than others and these papers do not cause industrial growth and are not worthwhile. With this supposition that the final goal of producing scientific papers is development of industry and consequently economical growth, this trend is not probably desired and it should have been some changes in motivations of producing this kind of papers in order that this trend would change to our desired form. In this paper, consequences of continuance of current trend will be shown and some suggestions to improve the trend will be made.

II. Statement of the Problem

Considering the introduction, it's seen that the current trend is not beneficial and can't cause industrial growth. Whereas there is a huge expectation from faculty members to surmount scientific needs of industry. If they can't do that, industrialization trend will have serious hinders and the probability of being a powerful and wealthy country in industry and economy will be less and less. And more than before, Iran will be a big importer of technology and one of the biggest consuming countries that can't afford its needs. And this trend is not desired and for ameliorate of this we should put in an alternative. Our current problem is how we can improve the motivation of producing papers that they are beneficial for industrial needs, by faculty members, with some changes in promotion of faculty members process. And investigate how improves industry and economy of Iran by this changes

In this paper we study engineering fields which are in a tight relationship with industry and other categories of science such as humanities and fundamental sciences would not be considered.

III. Dynamic Hypothesis

Industrial Production indicates amount of industrial products of the country. Increment rate of this stock is related to the number of domestic papers (with a 3th order delay), number of patents, and genuine promotion of faculty members (the one that comes afterward).

Research budget indicates the research budget in all over the country. A portion of this budget is supplied by government and the rest is a function of amount of industrial production (f2). Research budget directly indicates number of applied inventions (patents) and number of published papers. For better understanding of effect of papers we categorized them into 3 groups.

1. Dummy papers: scientifically and practically useless papers which cause fake promotion of faculty members, these papers usually published in journals or magazines with low IF (Impact Factor).
2. Domestic papers: papers that lead to technological improvement and producing products.
3. International papers: papers that they are in international technology level and because of technological gap between Iran and industrialized countries, they would not cause improvement in industrial producing.

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In this dynamic model for applying effect of the gap between international technology level with Iran, we model the first one with high initial amount and low raising rate (because in current era there is no technological eruption). Whereas interior technology is impressionable from actual promotion of faculty members and industrial products.

At the most aggregate of these three kinds of papers, indicates all the ISI papers in Iran. Whereas increment in number of each kind of papers indicates less tendency to publish other kinds of papers. This mechanism has been modeled by an auxiliary variable named Sum of Coefficients.

Two other stocks exist in this model. The first is faculty member rankings, caused by fake promotion (by publishing dummy papers) and the second is the rank of faculty members caused by genuine promotion (by publishing domestic and international papers). Different effects of each kind of papers on them is specified.

IV. Causal Loops

A. The main loop of research budget

Figure1 indicates the relation between research budget, industrial production and number of papers. By increment of industrial production, research budget increases. The government help is a part of this budget. Increment of this budget causes increment in number of papers and inventions and patents. But in here only domestic papers cause increment in industrial production.

This loop, as shown in figure1, has a positive feedback.

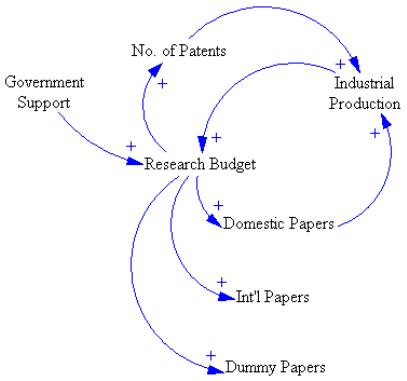

Fig. 1: The main loop of research budget

B. Effect of faculty upgrade

Here we affect 2 other kinds of papers on above loop. Domestic and international published papers have positive influence in industrial production but dummy papers because of fake promotion of faculty members have negative effect on industrial production. As it shown in figures, there is a positive feedback in first loop and in the second one there is a negative feedback loop.

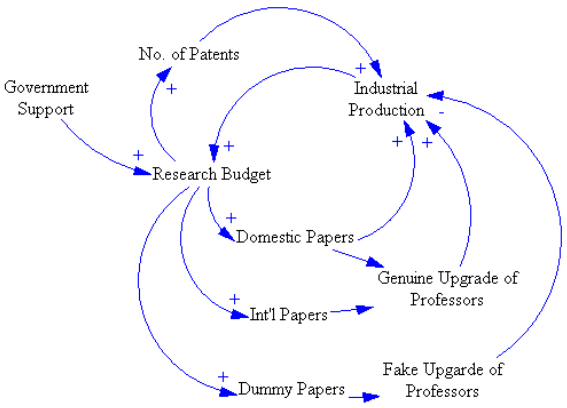

Fig. 2: Effect of faculty upgrade

C. The loop of technological gap

In this part we consider the gap between Iran's technology and international's. As the gap (which is influenced by realistic promotion of faculty members and industrial production) goes wider, tendency to publish papers in international level increases and it cause decrement in publishing domestic papers. So there will be a negative feedback loop for industrial production. Also increment in each kind of papers causes less tendency to publish the other kinds.

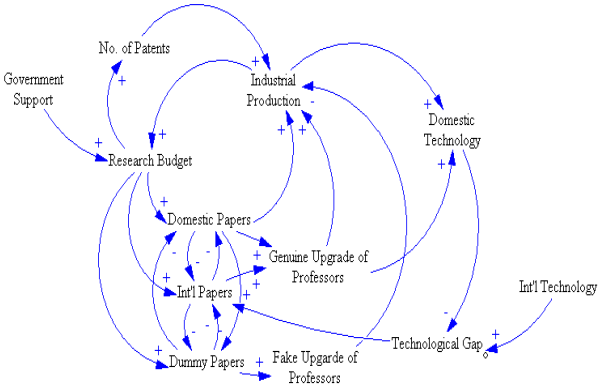

Fig. 3: The loop of technological gap

V. Analyzing the Results

The dynamic model comprises two positive loops as well as a negative one (Fig. 4). Total number of ISI papers and number of each specific kind of papers and also the industrial production are the key parameters to observe in this model. Time scale is month and currency is million tomans (1$≈1000 tomans).

By setting the initial values for current number of published papers in Iran and amount of industrial production, the model is simulated for 300 months and the key parameters behaved as the following figures.

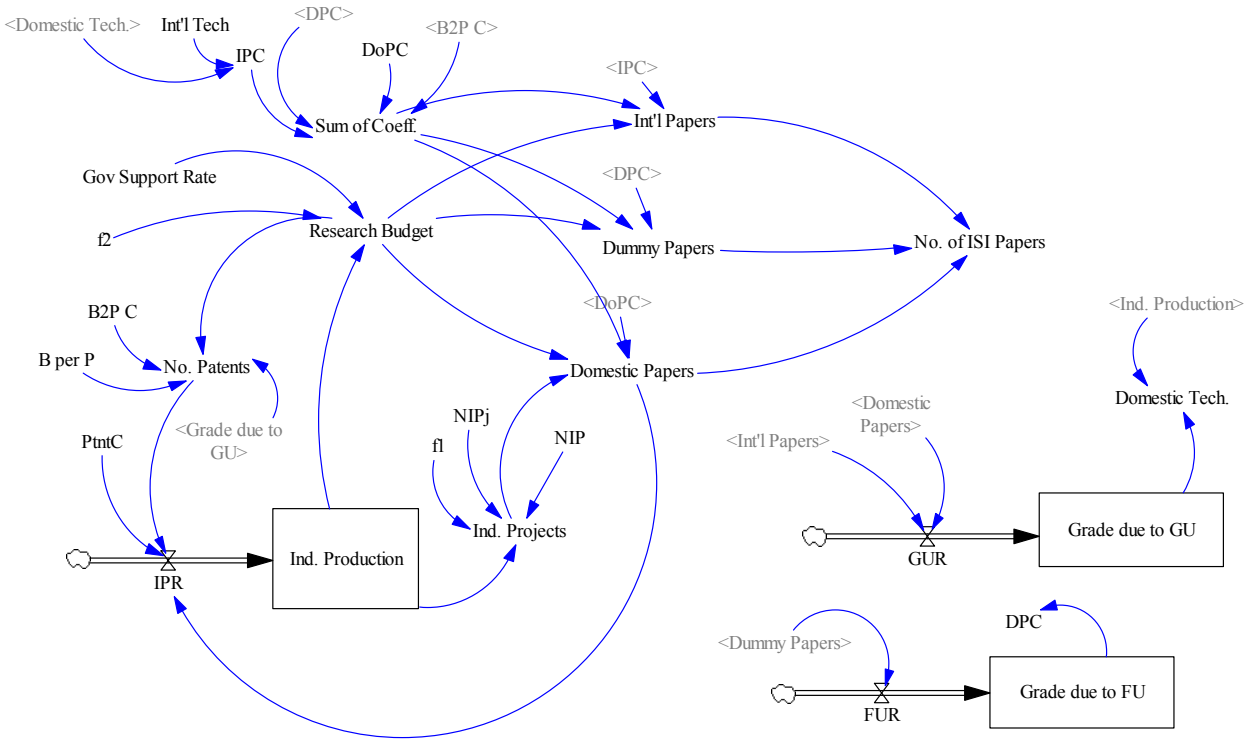

Fig. 4: Stock flow diagram of model

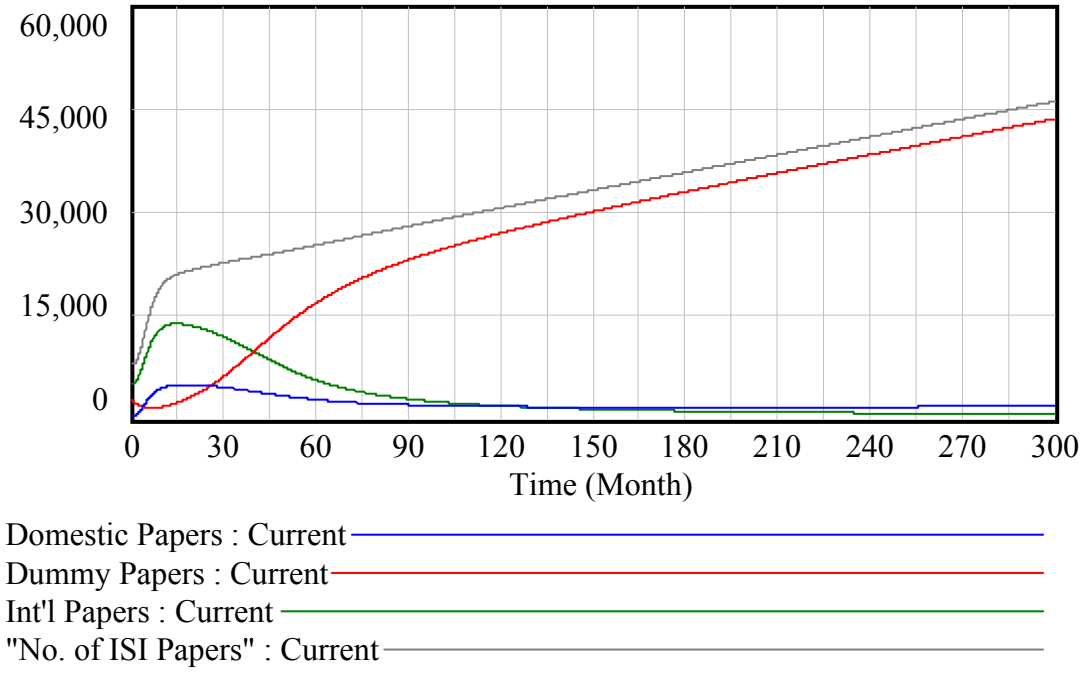

Fig. 5: Number of papers as key parameters

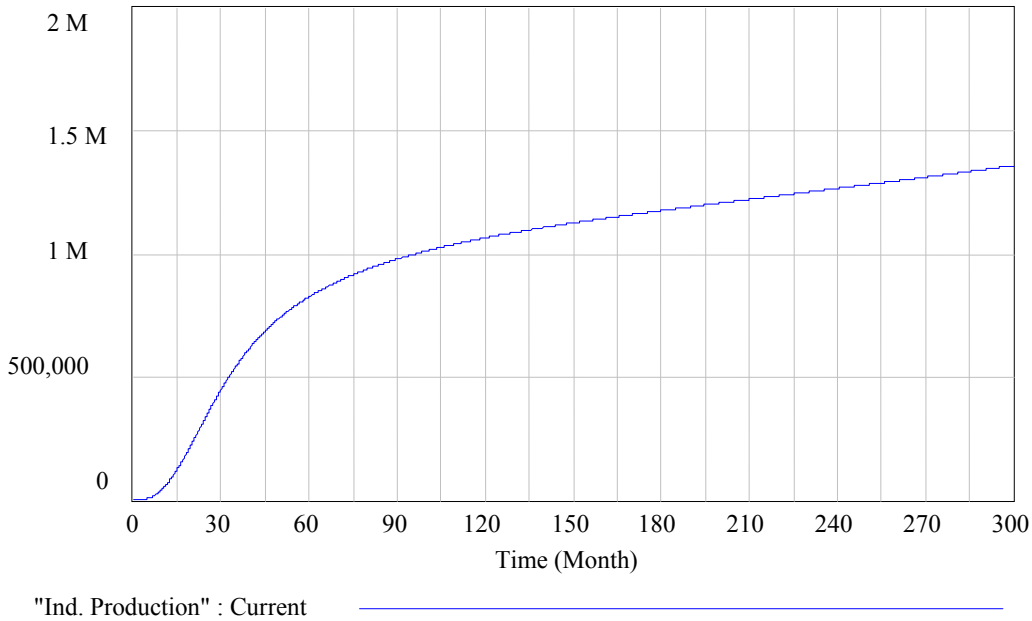

Fig. 6: Industrial production trend

As shown in figures, by continuation of current trend and faculty upgrade upon number of ISI papers, number of Dummy papers will increase drastically and this issue affect the industrial production and diminish its increase rate. Number of Domestic papers also settle in a constant and low level that can be referred to governmental support of research budget and fixed research budget comes from industrial income.

VI. Suggested Policies

Considering the behavior of the model, a policy should be suggested that can make the industrial growth constant and decrease the number of Dummy papers in order to increase the technological level and number of Domestic papers.

A reasonable policy is decrease the dependency of faculty upgrade due to number of ISI papers. This change can be made in model by decreasing the P2UR coefficient (number of paper to faculty upgrade rate coefficient). After applying this policy in model, the results of the industrial production and number of Domestic papers are satisfactory in comparison with previous results.

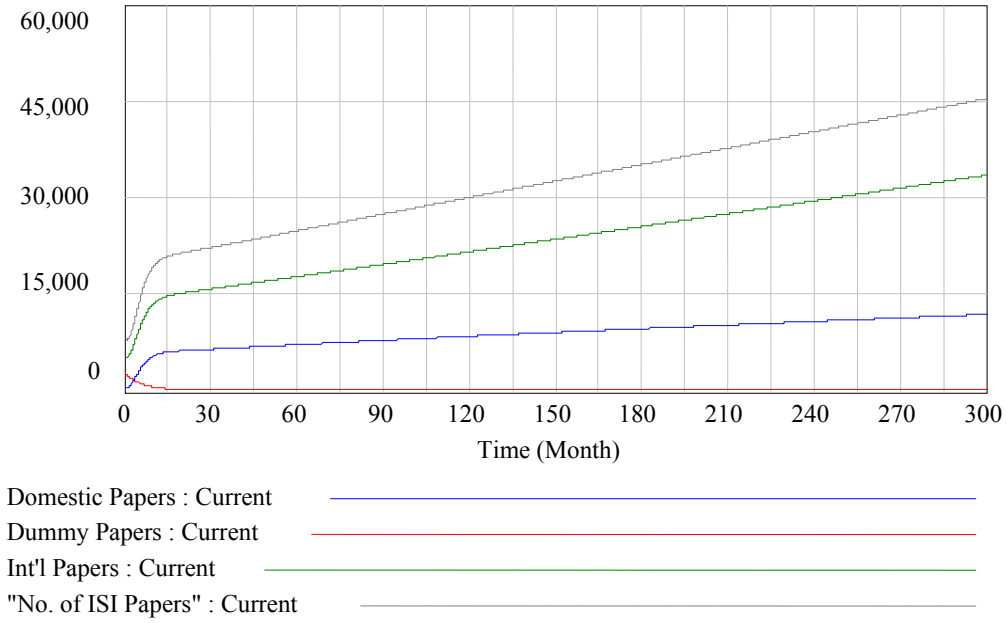

Fig. 7: Number of papers after applying the new policy

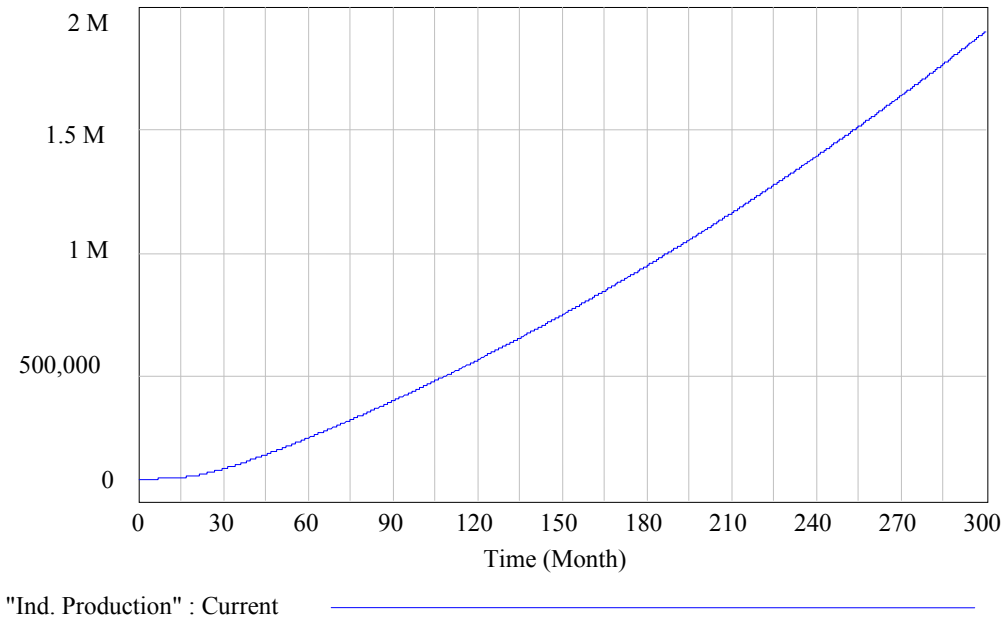

Fig. 8: Industrial production after applying the new policy

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