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# Process mechanism research of manufacturing generic technology innovation

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**ABSTRACT**

The innovation of generic technology for the development of the manufacturing sector has an important basic role, and for the generic technology research and development, there is lack of effective attention. Especially in manufacturing industry, the development of generic technology still can't meet the national economy and the needs of the development of manufacturing industry. Especially compared with foreign countries generic technology innovation development and application there is a considerable gap. On the basis of introducing the classification and features of manufacturing generic technology, this paper analyzes the influence factors and main body of generic technology innovation in the manufacturing industry. Finally, it derived the process model of manufacturing generic technology innovation from the process model of manufacturing technology innovation



## Introduction

Manufacturing directly reflects a country's productivity level, and its technology innovation capabilities are the key point to become a manufacturing power.For manufacturing enterprise, technology innovation has become the important foundation and power of the development of modern manufacturing industry, is the inexhaustible source of the enterprise vitality. To change the inferior status of our country in the international division of labor in manufacturing industry To change our country manufacturing inferior position in the international division of labor , we must improve the ability of own technology innovation.

Manufacturing industry relates to the technical innovation is very rich, but the breakthrough in generic technology innovation and application is an important link to enhance the technical level of the manufacturing industry, is also the necessary content of the manufacturing power construction. On the majority of manufacturing enterprises, a few enterprises focused on the development and improvement of the key technology to the enterprise competitiveness. But to be able to drive whole industry to upgrade the technology level of generic technology, few enterprises pay attention, thereby constraining the integral development of manufacturing industry. Formation of manufacturing innovative development environment for generic technology is an important practical problem which we need to face.

## 1 Influence factors of manufacturing generic technology innovation

### 1.1 The category and characteristics of manufacturing generic technology

**(1)The category of manufacturing generic technology**

Manufacturing is a industry that refers to manufacturing resources (materials, energy, equipment, tools, capital, technology, information and human, etc), according to market requirement, through the manufacturing process, into industrial products and daily consumer goods for human use and utilization. It includes all 30 industries after deducting mining and public industry. According to the use in the production of the material form, manufacturing industry can be divided into discrete manufacturing and process manufacturing. Manufacturing include: product manufacture, design, raw material purchase, storage and transportation, order processing, wholesale and retail business. In the enterprise (units) mainly engaged in manufacture products, manufacturing is the assembly and installation activities of mechanical and equipment for product sales.

Manufacturing generic manufacturing technology includes material and selection, manufacturing technology, automation, test, standardization and system management technology. It supports the ten million kind of competitive products and design, manufacture, management and marketing in the whole process, and also determines the whole technical level and development of manufacturing in the future.

(2) The characteristics of manufacturing generic technology

Generic technology [1] is a kind of technology that has been or may be widely used in the future in many areas, and its research results can be shared and have the depth of the impact of the whole industry or more industries and enterprises. Generic technology can be divided into key generic technology, general generic technology and basic generic technology. Similar to other generic technologies, manufacturing techniques also have five common characteristics [2]: advanced, sharing, risk, positive externalities and exclusivity.

But from the manufacturing industry's own characteristics, generic technology also has the following characteristics:

**①lexibility**

Manufacturing market mechanism is not perfect, and generic technology is based on the market opportunity of innovation cooperation, so the adjustment is easier.

**②oncentration**

Manufacturing is relatively concentrated, and mostly in the area of abundant.

**③cale efficiency**

China's manufacturing R & D capacity is insufficient, and generic technologies can be combined with each of the main advantages and achieve economies of scale.

1.2 Key considerations in the process of manufacturing generic technology innovation

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Speaking of the manufacturing industry, its overall technical development and technical innovation capacity are still relatively weak, and the market mechanism is not perfect, and in generic technology innovation these problems is outstanding. As a kind of sharing technology, only by generic technology innovation ability of the enterprise itself is hard to bear, what it needs is a good investment policy environment and perfect mechanisms for collaborative research.

The first is market [2] .Generic technology belongs to the" quasi public product", and market supply difficult to play a fundamental role. Manufacturing generic technology research ignored the market value, resulting in low sensitivity of the market. In China, market mechanism is still not perfect, so the stimulating effect of the market is more difficult to be fully realized.

The second is investment. Generic technology has a quite wide range of use, it can be applied in one or more industries. Individual companies are reluctant or very few to invest generic technology research. So the current R & D funding of manufacturing generic technology directly provided by the government, with a single form and limited ability. Therefore, the government should guide the multi-channel investment mechanism.

The third is organization. At present, a single subject of generic technology for development is common, but each enterprise, institution's ability is limited. R&D organization mechanism of cooperation also has many problems, such as the shared interests, risks and performance evaluation. Innovation system is still not effectively integrated resources and interactive collaboration, resulting in scattered research resources of generic technology and duplication of research activities.

**The composition subject and function of manufacturing generic technology innovation**

As mentioned above, manufacturing generic technology appeared "nobody" supply phenomenon, and generic technology innovation subject vacancy, so that individual enterprises difficult to have research abilities of generic technology. On the other hand, with the development of science and technology, technical progress and technical innovation highlights a more important position. Therefore, we must be clear about the main body of manufacturing generic technology innovation.

In the process of manufacturing generic technology innovation, in addition to generic technology innovation of enterprise, government, universities and research institutions, innovation subject more involved intermediary institutions, while the main body of cooperation, exchanges, sharing achievements in innovation plays a more important role. The government is in the leading position, and generic technology innovation need government policy support and financial assistance; Generic technology companies should be an active participant in the development process, whether the enterprise has the basic conditions for independent research and development is an important factor for taking internal R & D or external cooperation; Low capacity for independent research and development companies primarily through collaboration with universities and research institutions to form technical innovation; Colleges and universities will help to enhance business and society as a whole technological innovation; research organizations to solve technical bottlenecks and industrialization; Intermediary role is mainly to develop industry standards, information transmission, to build a platform and benefits co-ordination of cooperation for businesses, universities and research institutes.

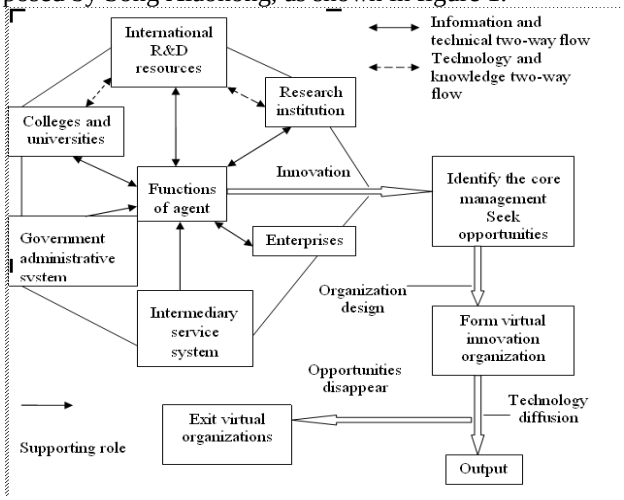
**Table 1 Comparison of manufacturing generic technology innovation**

| Main body | Function | The main resources available | Role |
|---|---|---|---|
| Enterprise | Integration of internal and external information and resources | Market and customer demand information | Core subject |
| Colleges and universities | Enhance technical innovation ability of enterprises and the whole society | Talent | Basic subjects |
| Research institutions | Resolve technology bottleneck, realize industrialization | Technology | Basic subjects |
| Government | Realize government investment in public | Policy and funding | Organization and guidance |
| Intermediary institutions | Encourage existing condition of science and technology resource sharing | Intermediate platform and services | Coordination and integration |

3 Process mode of manufacturing generic technology innovation

**Process of manufacturing technology innovation**

According to different research contents, technical innovation process has different classification. According to the characteristics of manufacturing technology, this paper draws on process model of manufacturing technology innovation proposed by Song Xiaohong, as shown in figure 1.




**Process of manufacturing generic technology innovation**

According to the process model of manufacturing technology innovation and characteristic of manufacturing generic technology, we can further deduce process model of generic technology innovation, as shown in figure 2. In this model, the government, enterprises, universities and research institutions, as well as the intermediary establish the information, technology and knowledge of two-way flow of generic technology innovation alliance. Its members can share resources of innovation. We should understand generic technical market demand environment, through the intermediary of certain cooperation platform and related interests coordination form generic technology center, so the product is a generic technology innovation. Finally, through the diffusion of technology make the technical innovation efficiency maximization. When it is gone, some subjects may feel the costs of establishing technical

innovation center outweigh the benefits, so he will chose to withdraw from the generic technology center.

**This process differs from the above process:**

**Composition of main body**

By the government, enterprises, universities and research institutions, intermediary institutions five main parts, the main body and the leading role of government is more obvious. Differ from the technology innovation process require international R & D, generic technology innovation is more outstanding industry characteristics, and some generic technology have strong regional directivity, so what more need to study is a unique research and development resources.

**Main body internal communication**

It increases information and technology exchange of three main internal (enterprises, universities and research institutions). Generic technology is a kind of industry sharing among technology, so increase body flow contribute to the mutual learning, easy to produce innovative ideas, and more conducive to the technology development and application.

(3) Role of intermediary

Intermediary is not only just providing resources, but also including integration of related resources, and it according to market conditions to determine the platform for cooperation and the coordination of the main interests. Strengthen the role of intermediary will help to benefit-sharing, performance evaluation and effective integration of research resources on innovation system, so that the economic benefits of generic technology more prominent.

**Conclusions**

Generic technology is a technology that can be widely used in one or more industries, and it is in pre-competitive phase of the technology. It has greater economic and social benefits. Generic technology is in a basic position in the entire innovation chain, and it is related to the prerequisite for further development of industrial technology. For it involves many departments, elements of wide, various relationships between factors and departments, it results in the innovation process complexity.

This paper analyzed factors of manufacturing generic technology innovation (including market, investment and organization) and the composition subject (the government, enterprises, universities and research institutions, intermediary institutions) on the basis of introducing the manufacturing technologies classification and features. It derived the process model of manufacturing generic technology innovation from the process model of manufacturing technology innovation. At present, the actual development situation of the innovation process is quite inadequate, such as shared mechanism between the main is not perfect, R & D investment in a single channel, inter-firm technology is not closely linked, and so on. Therefore, generic technology innovation can promote the manufacturing technology innovation and enhance the overall level of development of manufacturing industry under five major subjects in good working environment.

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