Exploration on Multi-vocation Channels of R&D Staff in Manufacturing Enterprises and Their Guarantee Mechanism

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Abstract: It is necessary and feasible as well to design multi-vocation channels. This paper states the present career situations of R&D staff in manufacturing enterprises, analyses the necessities of setting multi-vocation channels, constructs multi-vocation modes for R&D staff, and designs guarantee systems for carrying out the multi-vocation channels of R&D staff.

Keywords: manufacturing enterprises, R&D staff, (multi) vocation channels; guarantee system

1 The Necessities of Setting Multi-vocation Channels for R&D Staff in Manufacturing Enterprises

From March to August in 2008, other members of the research staff and I obtained effective questionnaires from 31 human resources managers and 285 R&D members in 38 manufacturing enterprises in Panyu District, Guangzhou City. We find through analysis that 80.37% of the R&D members are under the age of 35, about 40% of the R&D members stay in the same enterprise for no more than 3 years. We also find that most people who stay in the same enterprise for 3 to 5 years or longer are unsatisfied with their innovative passion and abilities, as well as employment prospect. The becoming younger, high separation rate and vocational plateau phenomenon of R&D members greatly decrease their job satisfaction and loyalty to the enterprises. If the enterprises cannot manage to solve all the problems, this is sure to lead to the members’ lack of innovative passion and decrease of innovative abilities. And it even leads to the leaving of the employees, and then results in insufficient R&D abilities of new products, and losing of core competitiveness. After interviewing some HR managers and R&D managers, I finds that the enterprises have provided excellent work environment, high welfare and good training opportunities in order to motivate the staff, decrease the separation rate and rid the vocational plateau phenomenon, but there still exist the high separation rate and vocational plateau phenomenon. How to reduce the possibilities of the phenomena? I think it is extremely necessary to set multi-vocation channels for R&D staff!

1.1 The R&D staff needs a kind of “withdrawal mechanism”

The staff have different macro-environments, organization environments, family environments, individual vocational phases, work state and individual physical and mental states, and have different “loyalty degree” which can vary, so they all need a kind of “withdrawal mechanism”, through which they can shift their posts from R&D to other posts.

1.2 The enterprises lack “withdrawal mechanism”

The majority of the R&D staff can only develop their career on this channel, and only some large and medium-sized manufacturing enterprises provide the staff with channels of administrative promotion(promotion of administrative posts in R&D) and promotion of technical titles(promotion of technical titles or grades in R&D), and all this means that the majority of the R&D staff in one organization can only be engaged in this very line.

Note: In the paper, R&D staff refer those who are engaged in applied research and development in manufacturing enterprises, but not include the members who give service to research and development.
1.3 It is difficult to retain the innovative passion and abilities of the R&D staff
The conclusion about innovative abilities of Kuck Curve(Kuck, 1992), together with my survey, shows that the R&D staff can keep their high innovative passion and abilities in one post for only 3 to 4 years. The enterprises should change their work content and environment, that is, their posts should be shifted in order to make them energetic and vigorous. But in reality, the administrative promotion and promotion of technical titles can only meet the requirements of part of the employees in this line[3], but for those who have little hope of the two kinds of promotions but have great passion, they can only choose to leave the enterprises.

1.4 The R&D members’ change of posts arising from the expansion of the enterprises’ business
The manufacturing enterprises need to employ full-time senior technical trainers to increase the abilities and work efficiency of the R&D staff. The market forecasting departments need survey experts who know the line very well. The clients appreciate marketing representatives who are proficient in the products. The customers need experts who can serve them satisfactorily.

From above-mentioned analysis, we can come to a conclusion that it is necessary to set multi-vocation channels for R&D staff from the perspectives of individuals and manufacturing enterprises.

2 The Development Modes of Multi-vocation Channels for R&D Staff in Manufacturing Enterprises

Suppose that one manufacturing enterprise has enterprise “university”(or having interior technical training ) and that the clients of this enterprise need the service of installment, debugging, technical guidance or maintenance and repair of the products, then we can employ the five channels which are displayed in figure 1 for the R&D staff: R&D channel, management channel, market channel, technological support channel and training channel.

2.1 The R&D channel
This channel is designed for the enterprise product R&D staff and technique R&D staff who stay in the original line to develop their career. It provides longitudinal technical development route for the R&D staff, and stimulates the latter to enhance their knowledge and abilities of R&D, and to make the greatest contributions possible to the enterprise, and simultaneously embody their own value. The “highest” grade of the channel depends on the importance of the R&D posts in the enterprise, and the numbers of the grades can be set according to the scale of the R&D members and the management grades. For example, the management grades can be classified into 8: general manager, vice-general manager, assistant general manager or department head, vice department head, manager or assistant department head, person in charge, intermediate administrative person, preliminary administrative person, and then 6 grades can be set in the R&D channels: chief engineer, experienced engineer, senior engineer, engineer, assistant engineer, intern engineer[4], and the highest grade engineer should be equal to vice general manager in grade, while the lowest engineer should be equal to intermediate administrative person in grade. The intern engineers in the R&D channel are usually college graduates who have entered the enterprises for one year. The enterprises should decide on the numbers of grades and qualifications for each grade according to the real situations.

2.2 The management channel
This channel is designed to help R&D members who have great desires to do management work and have management abilities to develop their cross- channel career. People who get promoted in this channel will be engaged in work of guiding and managing the R&D staff, thus they are required to enhance their managing abilities with excellent performance and abilities in R&D. In a traditional sense, this is a career channel appreciated by the R&D staff. In this channel the following grades can be set: vice-general-manager-technology, department head of R&D, project manager, group leader of project, and of course, such posts as vice department head of R&D, vice project manager, person in charge of the project can also be set according to the real situations of the enterprises. The shift from the technology
channel to management channel can be showed through horizontal arrows or slanting arrows in the figure 1, and the two-way arrows indicate two-way flows.

![Diagram of Multi-vocation Channels of R&D Staff in Manufacturing Enterprises]

**Figure 1 Multi-vocation Channels of R&D Staff in Manufacturing Enterprises**

### 2.3 The market channel
This channel is designed for those who like to venture and challenge, disdain difficulties, prefer to act on their own, excel in social activities and who are no longer willing to do R&D work in the enterprises. If R&D members with certain technology do such work as market survey and forecasting, popularization and marketing of products, they can nearly more accurately acquire information concerning clients’ real demand and potential demand, and on the basis, make scientific forecasting (compared with common marketing staff). They can also better answer technical questions posed by the clients, and impress the latter as being experts, and thus are more likely to get the clients’ trust (compared with common marketing staff). These channels have already existed in some companies, but are always required by the R&D staff, and only a small part have been guided and arranged by the enterprises. People who change posts from R&D to marketing should study and receive training in the area of marketing and sales.

### 2.4 The technological support channel
This channel is designed for those who like to do technical work, maintain loyalty to the enterprises, have obvious decrease in innovative passion and abilities, excel in consciousness to serve others and who are no longer willing to do R&D work in the enterprises. With knowledge, experience and skill of design, experiment and manufacturing of the products, experienced R&D members’ choosing to do the work of installment, debugging, technical guidance, maintenance and repair is like “kill three birds with one stone”: for the enterprises, individuals and clients. The work in this channel is comparatively less challenging, stable and comfortable, and thus provides fairly good development routes for those who

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Note: In figure 1, the arrow direction represents the development course, the thick line means the development between channels.
lack innovative passion or abilities but still prefer to do R&D work.

2.5 The training channel
This channel is set for those who possess loyalty to the enterprises, lack innovative passion and abilities, excel in R&D experience, pursue stable posts and who are no longer willing to do R&D work in the enterprises. After years of work, R&D members will have decrease in their innovative passion and abilities, have considerable physical and mental change. To solve this problem, the enterprises can provide training channels for those R&D members with excellent performance, abundant experience, good learning abilities, close attention to life and family, willingness and abilities to do training work. The enterprises can recruit them as full-time trainers for technical training courses, with the hope that they can pass on their knowledge, experience and skills to preliminary R&D members.

3 Guarantee Mechanism of Carrying Out the R&D Staff’s Multi-vocation Channels

If the R&D members want to get promoted longitudinally and change posts transversally, it is necessary to have sound organs, normal procedures, scientific methods, perfect systems and make members in proper place. Only by doing this can people achieve ideal effects. For this purpose, the enterprises should provide guarantee mechanism for carrying out the R&D staff’s multi-vocation channels.

3.1 Highly-efficient, coordination-oriented guarantee mechanism of the organizations
A set of highly-efficient, systematically coordinative guarantee mechanism should be set in enterprises where multi-vocation channels are employed. This set of mechanism comprises perfect organs and management regulations. The members of the management organs are as follows: general manager, vice-general manager, persons in charge of multi vocation channels, head and full-time (or part-time) members of human resources department. The work of the management organs include specific design work of multi-vocation channels, the information announcement and selection of members in the course of changing of R&D members’ posts, supply of background materials of members who have a post change in this field, and the setting and perfection of management regulations of multi-vocation channels. The content of management regulations for multi-vocation channels covers the following: numbers of the channels, grades and qualification standards, the information announcement, application, selection and other specific requirements concerning longitudinal promotion and transversal post change in the same channel, the training, appraisal and stimulative systems in all channels and the like.

3.2 Morality, individuality, skill and performance-oriented selection mechanism
When the R&D members get promoted longitudinally and change posts transversally, the enterprises should set morality, individuality, skill and performance-oriented selection mechanism. This is done to indicate the personnel-use notions as equal competition opportunity, the mediocre persons should give way to the capable ones, person should match their posts, treat human being cardinally. So far as selection standards of members who should have post change are concerned, people cannot depend solely on diplomas, on qualifications and records of service, on academic titles, on identity. Instead, the members should be chosen on morality, individuality, skill and performance. Special emphasis should be laid on the professional morality, individuality, the matching between the technical capacities and the would-be posts. For example, such posts as technical support and technical training can not be ‘harbor’ for R&D members with mediocre skill and little ambition. Neither can people put excellent R&D members without management desire, individuality or ability to management posts. Of course, human arrangements should also be made for people with great contributions and people in financial trouble on proper occasions. As for selection methods of choosing people for post change, standardized procedures and scientific methods are needed. Experts should be invited and professional tools should be employed for the selection. The appraisal tools or methods should match the relevant posts.

3.3 The organization’s strategic needs and employees’ need-oriented training mechanism
For R&D members, training and improvement of management skills are needed for promotion in management channels, training and improvement of R&D skills are needed for promotion in R&D channels, and the knowledge and skill training concerning the would-be channels are needed for trans-channel flow. No matter what kind of training it is, first, people should make sure whether this training is needed for the strategy of the organizations, and on this basis combine with the employees’ individual needs. The training requirements of multi-vocation channels for R&D staff are the requirements of the enterprises’ development strategy as well as the employees’ individual requirements, and are to meet the needs of technical innovations, management innovations, service innovations, and market innovations. They are also to meet the R&D staff’s requirements of career life development and improvement of their loyalty to the organizations. To train the R&D staff, people should set scientific and effective collecting and verifying systems of training requirement information, training organizing and implementing system, training appraisal and rewards and punishment system, training agreement and anti-risk system.

3.4 Skill, performance-oriented assessment mechanism
The R&D members’ work on their own and creativeness decide that the normal assessment modes of morality, ability, attendance, and performance cannot be applied to them. Attitudes and behavior are not important while skill and performance are the most important factors. The R&D work has creativeness and risk, and the enterprises should arouse the enthusiasm of the R&D members, and enhance their self-confidence and creativeness, and lay special emphasis on outcome-oriented appraisal. The enterprises should set technical grade appraisal system and annual performance appraisal system for the R&D staff. The enterprises’ interior technical grade appraisal system mainly examines the technical knowledge, R&D ability, the dynamic change of R&D notions, and the assessment tool is systematic knowledge test, project or scene skill test, and the assessment results can be embodied through the interior technical qualification grade or technical titles. The annual performance appraisal comprises group performance and individual performance, and the R&D members’ performance is always embodied through group performance. The group performance is assessed by superior leaders of the enterprise, other departments (such as manufacturing, sales, technical support, human resources, finances, and the like), and typical client representatives, while individual performance is assessed by technical experts, persons in charge of R&D departments and persons in charge of R&D projects. If people weigh the two performances properly, they can get the R&D members’ annual performance. Technical grade assessment, annual performance assessment, and assessment of potential quality of R&D members together provide important reference evidence for next-phase interior career development.

3.5 Organizing vocational career oriented stimulative mechanism
The R&D members usually boast comparatively high wages. The enterprises should pay close attention to the exterior competitiveness and interior fairness of their wages, and what’s more important, special attention should be paid to the interior stimulation of their wages, that is, different wages should be offered according to different skills and performances. By doing this, the R&D staff can be motivated to improve their technology and make innovations. Simultaneously, the wages and welfare of excellent, high-grade R&D members should be equal to that of fairly-high grade administrative persons. By doing this can people motivate the R&D members to make progress, and avoid the phenomenon that the management channel is regarded as the sole “golden road”. Besides wages stimulation, the enterprises should also provide the R&D staff with excellent work environment, opportunities of technical training and technical exchange, establish a cultural environment where the R&D staff are respected and cared for, and on this basis, strengthen the career interior stimulation for the R&D members, make them love their work and not tempted by exterior stimulation. What’s more, because of the creativeness and hardships of the work, and also of the changeability of the exterior environment, interior conditions, families of the employees, and employees’ individual development, the R&D staff may decrease their loyalty to the career of R&D, but increase their loyalty to the enterprises. Then, the interior multi-vocation channels will serve as the best stimulation to them.
3.6 Cultural mechanism where innovations and development of individuality are encouraged

It is said that “money has the power of temptation whereas culture has centripetal force”. The enterprises should put the R&D staff together through highly effective cultural mechanism. First, the enterprises should erect the notion of “respect the knowledge and respect the talents”. Second, the enterprises should uphold and carry out the work value of “encourage innovations and endure failures”. Third, the enterprises should have the thought of “humanistic management”, and pay close attention to the diversity, individuality, and then “understand the employees, pay attention to them, cultivate them and care them”. Last, the enterprises should cultivate the cultural environment of “live and learn”, and establish the platform of “group learning and knowledge sharing”.

References