

## ISM Analysis on Managers' Income<sup>\*</sup>

Peng Mingxiang<sup>\*\*</sup> Li Shiming Lan Yong

(Dept.of Management, UEST of China Chengdu 610054)

**Abstract** The precondition of this paper is that the income of enterprises' managers should be tied to their performance. Factors that influence income of Enterprises' managers include individual factors, enterprise's factor, as well as environmental factors are described in this paper. According to their interaction with each other, these factors are qualitatively processed by using ISM method, and a multilevel stratum structure model for influential factors of managers' income is established. Through analyzing the model, we come to the conclusion that among these factors, enterprise's factor (enterprises' distribution structure) is key to managers' income. This will have great theoretic and realistic significance on the design of effective managers' incentive system.

**Key words** managers' income; influence factors; ISM method; structure model; incentive system

## 经理收入的ISM分析<sup>\*</sup>

彭明祥<sup>\*\*</sup> 李仕明 兰永

(电子科技大学管理学院 成都 610054)

**【摘要】**以经理的收入与经理的经营业绩相一致为假设,确定和分析了影响企业经理收入的个人、企业和外部环境因素。依据这些因素间存在的逻辑关系,运用解析结构模型(ISM)方法进行了定量处理,建立了影响经理收入因素的多级递阶结构模型。通过模型,得出企业因素对经理收入起着决定性作用,为建立有效的经理激励机制提供了理论和实际依据。

**关键词** 经理收入; 影响因素; ISM方法; 结构模型; 激励机制

**中图分类号** F270

With the deepening of Chinese economic reform and the development of market economy, enterprises are becoming main body of market competition. The income of enterprise managers surely should be tied to the performance of enterprises or managers. Prestigious managers with "high-quality" should also gain "high value" and "high price (high income)" through competitive system. Finally, the system will match manager's competence with their value and a set of efficient incentive structure will come into being.

The assumption of this article is that, with the development of market economy, to tie managers

---

Received on April 23, 2002  
2002年4月23日收稿

\* The Project is supported by the Natural Whizz-kid Science Fund, No: 79925002  
国家杰出青年科学基金资助项目, 编号: 79925002

\*\* 男 33岁 在职硕士生

income to their performance already has been accepted or should be accepted through common practice. The research of managers' performance and the research of their income are identical. Therefore, in order to set up managers incentive system, we should first analyze factors which influence managers performance or their income, and analyze the structure of these factors, find out core factor, so as to set up scientific and efficient incentive system and have a definite object in view.

## 1 Factors Which Influence Managers Income

A series of deep research has been done to manager's incentive issue in commission theory, game theory and information economics<sup>[1-3]</sup>. But all focus on short-term incentive research. These highly abstract short term and long term. The managers reward incentive system is directly tied to manager's income. Research on factors which influence managers income restrained the effectiveness of research result.

So the analysis on manager's income includes both exploring widely factors which influence manager's income and analyzing the relationship between these factors, extracting core factor. As all of these factors influence manager's income in one way or another, there must be certain connection(or structure)among them. The logic analysis is to analyze former, then latter.

Result through synthesis analysis is factors that influence professional manager's income include individual factor, enterprise factor and outside factor.

### 1.1 Individual Factor

We chose four basic variables for individual factor: individual effort, income expectancy, and competence state and competence investment. The relationship between these four variables is complicated. Usually, individual effort and competence state influence managers income (or performance) directly, on the other hand, individual effort will be influenced by income expectancy, competence state will change income expectancy, competence investment promote competence state and income expectancy will also influence competence investment.

### 1.2 Enterprises Factor

Enterprises factor is mainly distribution or payment structure. Distribution structure to managers is like double-edged knife. Reasonable distribution structure will stimulate manager's competence and incentive while unreasonable distribution structure will restrict manager's competence and incentive. So, manager's income and distribution structure are closely linked.

### 1.3 Environment Factors

External environment factors include competitive structure (or competitive position), market position (demand and supply position), environment risks, policy, economic cycle etc. Compared with individual factor, environment factors are hard to control by managers and enterprises, sometimes even unexpected. At the same time, environment factors influence individual factor and distribution structure, thus influence managers' income greatly.

## 2 ISM Structure Model of Managers' Income

Here is certainly some logic relationship between factors that influence managers' income. ISM structure model provides a way to transform this logic structure into stratum structure and to define key influential factor, so as to establish an effective incentive system<sup>[4,5]</sup>.

### 2.1 Vectograph

Basic method of drawing vectograph is to analyze these factors, find out direct interaction between two factors and then make a drawing of their relationship. We come to figure 1: vectograph G—factors that influence managers' income.

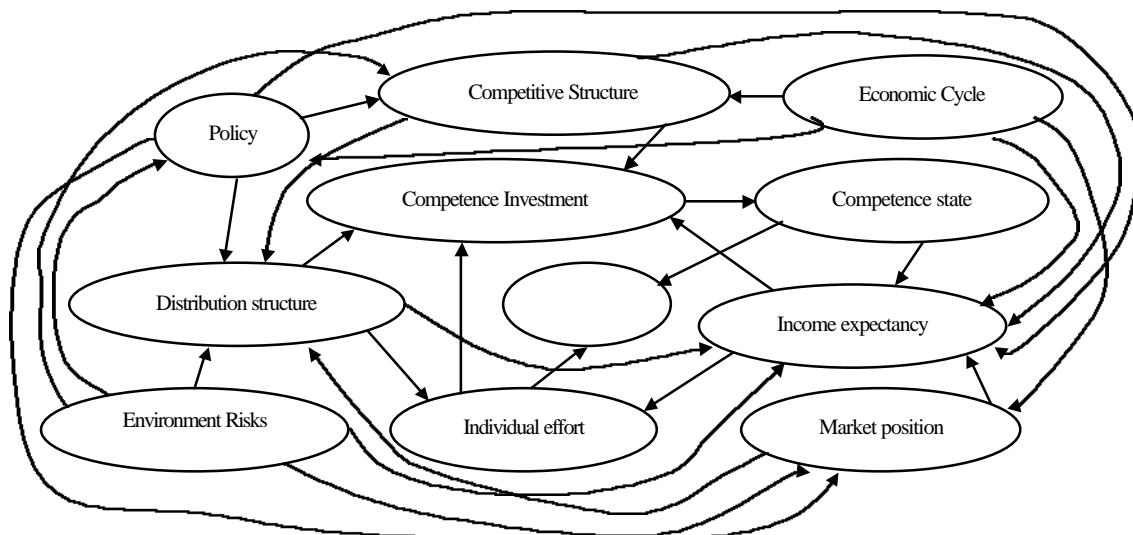


Figure 1 Vectograph G of managers' income

### 2.2 Structure Analysis of the Vectograph

Basic method of the analysis is: based on vectograph G, draw matrix 1: adjoining matrix  $A$ , then through Bull calculation, we get matrix 2: reachable matrix  $R$ , through stratum differentiation  $(P)$ , we get structure matrix 3: the graduation structure matrix  $R'$ . Finally we get figure 2: ISM structure model of managers income.

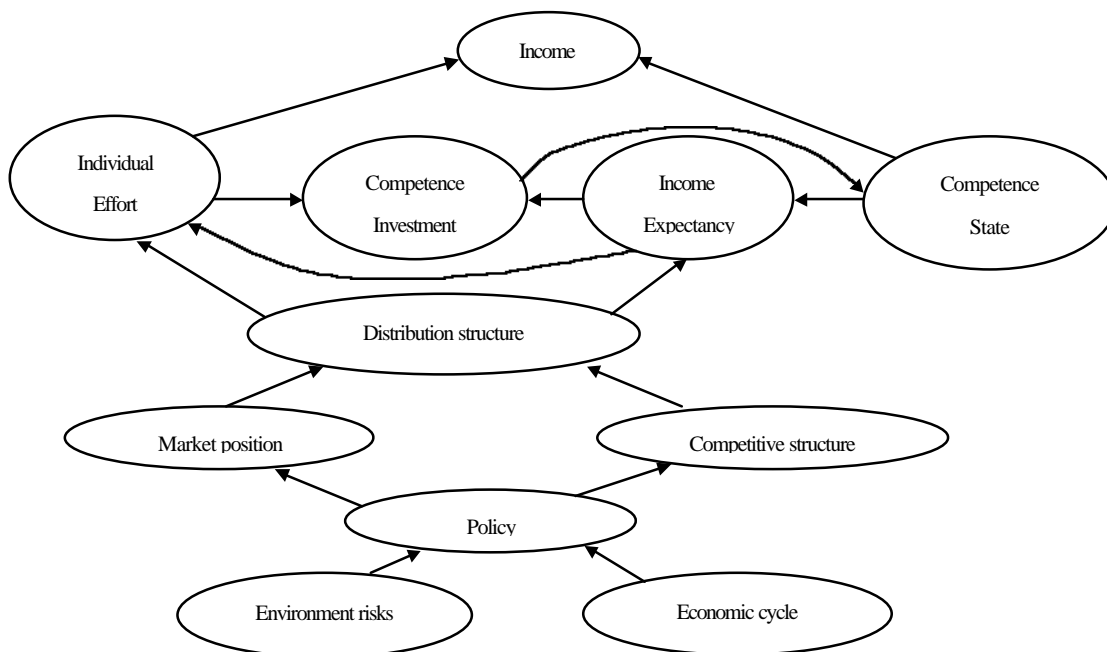


Figure 2 ISM of managers' income

### 3 Analysis on ISM Structure Model

An ISM structure model will be influenced by processor's values, experience and external factors. However, we assume that other factors ( such as capital, material and labor ) are definite, then managers' income is tied to their performance. This result could use for reference.

From this structure model we could see that individual factor of managers influences their income most directly. Among the four variables of individual effort, income expectation, competence state and competence investment, individual effort and competence state influence managers' income more directly. Income expectation is personal expectation towards future, it exerts influence on income through personal effort. Competence investment is a long term accumulative process, it exerts influence through competence state. These four variables move in circles and interact each other. This dynamic cycle requires professional managers to work harder and update their knowledge, enrich their experience and enlarge their vision to gain satisfactory income.

We think that generally speaking, individual effort influences performance mainly on short term while competence state influences performance on long term. If managers' effort was to goose that lays the golden eggs and sacrifice long term development of enterprises. So the processing result of the model provides theoretic guidance for people to design incentive system and verifies the theory of human capital investment, but also show us that in order to achieve excellent enterprises' output, we should consider both short term incentive to stimulate managers to work hard and long term incentive for managers to invest in competence improvement and invest in human capital .

The second layer of factors that influence managers' income is enterprises' factor, e, g distribution structure. This layer of factor is the key factor for enterprises and analysts. For ISM model we could see, ((1,2,3,4,5,6,7,8,9,10,11) in matrix  $A$ , matrix  $R$ , matrix  $R'$  respectively represent income, individual effort, income expectancy, competence position, competence investment, destruction structure, competitive structure, policy, environment risks, and economic cycle and market position).

$$A = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \end{matrix} & \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{matrix}$$

distribution structure is a connecting link between the preceding and the following. Distribution structure influences managers' effort and income expectation directly while their effort influences income directly. In variables of individual factor, individual effort is easier to be controlled by managers themselves,

$$\begin{aligned}
 & \begin{matrix} & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \end{matrix} & \left[ \begin{array}{cccccccccccc} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 1 \end{array} \right] \\
 \\
 & \begin{matrix} & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 11 & 8 & 9 & 10 \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 11 \\ 8 \\ 9 \\ 10 \end{matrix} & \left[ \begin{array}{cccccccccccc} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 \end{array} \right] \\
 \end{aligned}
 \end{matrix}$$

so it has greater influence on managers' income. Distribution structure is restricted by external environment factor which is changing all the time and is out of enterprises' control. Enterprises can only control distribution structure and forms of distribution, such as base salary, welfare, bonus, options, position and opportunity to fulfill the linkage and initiate managers and buffer negative environment factor. So as to make enterprises and managers achieve more yielding.

Farther explanation of this point: distribution structure influences managers' incentive system through influencing individual effort and income expectation, so, while designing managers' distribution structure, we should make room for constructing long term incentive system, increase managers' long term income expectation--because long term income expectation not only influences individual effort, but also managers' competence investment. In this way, income expectation determines managers' competence state.

The third layer of factors that influence managers' income is market position and competitive structure. Market position determines enterprises' income and yielding which is also in direct proportion to enterprises' income and yielding. This means, the better the market position is, the better the enterprises' business and managers' income will be. Competitive structure is mainly competition of same or different trades which influences managers' income<sup>[6, 7]</sup>. This influence is transferred by distribution

structure. If enterprises implement effective distribution strategy, this influence could be buffered. Once this distribution strategy changes into effective incentive system, it will spur managers work harder to change adverse factors and bring enterprises and managers satisfactory income.

The forth layer of factors is policy. Policy refers mainly to macro policy of home and abroad, It remains stable in certain time. It influences managers' income rather indirectly, being transferred upward through market position and competitive structure. So, we should keep stability and transparency of policy, let market position and competitive structure operate in their own way, decrease artificial factors, so as to establish effective incentive system in enterprises.

The last layer of factors is environment risk and economic cycle. This is unable to control. Enterprises and managers should deal with this issue jointly to minimize losses of enterprises and individual.

## 4 Conclusion

The design of managers' incentive system should base on synchronic system of managers' income and their performance. Therefore, It's very important to analyze factors that influence managers' income and their structure. Through constructing and analyzing ISM structure model, we could see that managers' Performance or income is influenced directly by individual factor on the other hand, enterprises' distribution structure determines managers' effort, income expectation and competence state. So, enterprises' distribution structure is key to managers' income and managers' incentive system. Enterprises' distribution system must be effective and competitive, so as to spur managers to work hard to create the wealth of enterprises. We should combine base salary, welfare, bonus, options, position and opportunity to maximize the incentive effect. As for which distribution system enterprises should implement, or, the proportional analysis on factors which influence managers' income, including factor of distribution structure, external factor and managers' individual factor, we will discuss in another article on AHP analysis on managers' income.

## References

- 1 Zhang Weiyin. Game theory and information economics. Shanghai: Shanghai People's publishing House, 1996
- 2 Jensen, Michael C, William M, *et al.* The theory of firm: managerial behavior, agency costs, and capital structure. *Journal of Financial Economics*, 1976, 3: 305-360
- 3 Ross, Stephen A. The economic theory of agency: the principal's problem. *American Economic Review*, 1973, 63(2): 134-139
- 4 Li Shimin. Strategic management in modern enterprises. Chengdu: Publishing House of UESTC, 1994
- 5 Wang Yingluo. Systems engineering. Beijing: Mechanism Industry Publishing House, 1986
- 6 Li Zengquan. Incentive system and corporate performance. *Accounting Research*, 2000, 1: 24-30
- 7 Wei Gang. Incentives for top management and performance of listed companies. *Economic Research*, 2000, 3: 32-39