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MOT Education Expected by Small and Medium-Sized Enterprises

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Abstract

In Japan, the 1990s are referred to as "the lost decade," during which companies could no longer expect sustainable growth in high-quality and mass production businesses through exclusive support of efficiency. Management approaches using technologies as competitive strength came to be desired, in addition to "MBA" education (human resource development of management executives that realizes corporate and project strategies).

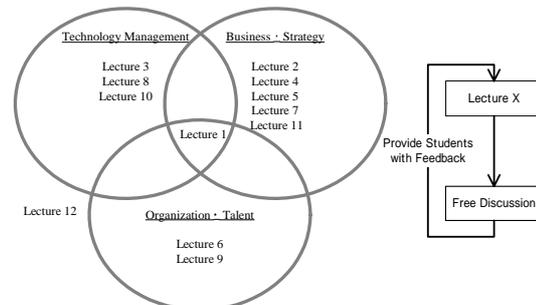
The necessity for MOT education has also been drastically affected by the historical background, and transformed. "MOT" education has been increasingly attracting attention in Japan, which advocates herself as built on intellectual property, unlike the old days. In fact, MOT incorporates "information" and "technology" as important management components as well as management resources: "human, development, and financial resources." It emphasizes that using technology as a great corporate strategy is a subject leading to the future era. Since our foundation, we have provided to clients technology-development support and new technologies as an information industry. All together, we studied in 2005 and 2006 to Monotsukuri Management Practice School (MMPS) of the University of Electro-Communications for further contribution to our customers. The expectation for MOT education through this participation is discussed in this report.

Keywords: MOT, Knowledge management, Creative Human Resources, MBA, Knowledge leadership

1 Subjects and Contents of the Lectures

Lectures were given on every third Saturday for

one year, 12 times in all, by Tadao Sumi (Principal, Musashino Management School) and Toshiaki Takeuchi (Adjunct Professor, the University of Electro-Communications). Participants were 40 working adults and 5 undergraduate and graduate students. The curriculum was as follows.



- Lecture 1: Introduction to manufacturing management
- Lecture 2: Co-operation theory for SMEs (Small and Medium-sized Enterprises)
- Lecture 3: Establishment of intellectual foundation using the idea marathon approach, and idea strategy
- Lecture 4: Finance and accounting in enterprises
- Lecture 5: Business simulation
- Lecture 6: Organizational ability fully using IT
- Lecture 7: Factory management for increased benefit
- Lecture 8: Practical industry-university cooperation and intellectual property rights
- Lecture 9: Human resource management program for activating enterprises
- Lecture 10: Quality control and quality design
- Lecture 11: Practical product development and marketing
- Lecture 12: Presentation and symposium

The contents of lectures were condensed because of limited time, and set to an average level considering the level differences among participants. The most important subjects might be arbitrary gatherings after lectures and free discussion. However, it might take more time to lead such a discussion to the discovery of direct subjects of research.

2 Situation Surrounding MOT Education

2.1 MOT Education Observed from the Information Industry

The information industry is affected by the trend of investment reduction first related to economic slowdowns, although we can expect investment only at the end of economic recovery. A severe economic slowdown will limit investment only in direct investments in information technology (accounting systems at financial institutions), and reduce indirect investments in information technology (information systems at financial institutions) at once. On the other hand, investments in accounting systems connected with direct businesses are still expanding on economic recovery prospects, although investments in information technology for encouraging differentiation among companies will be launched only at last.

Backbone engineers in information industries (with 5 to over 20 years of experience) are gen-

erally very poor at establishing personal connections and marketing. Even communication among engineers who have been involved in the same development is often conducted only passively and hesitantly. Once one development campaign is completed, even engineers who have shared pleasure, pain, and awareness of the problems as comrades will not usually deepen their fellowship further.

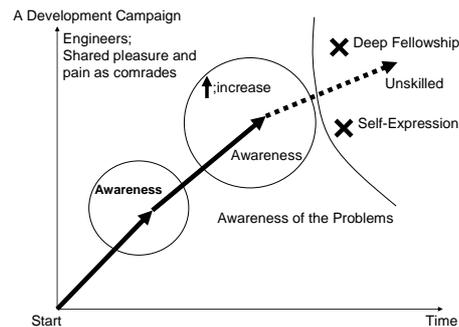


Figure 2. Self-Expression in a Business Culture

They know they are not good at communication. Furthermore, some make the excuse that they are in an environment where technical innovation is very rapid, and they are too busy getting accustomed to it. Engineers tend to advance development silently and become unwilling to communicate with others. Consequently, a business culture of very unskilled self-expression is formed.

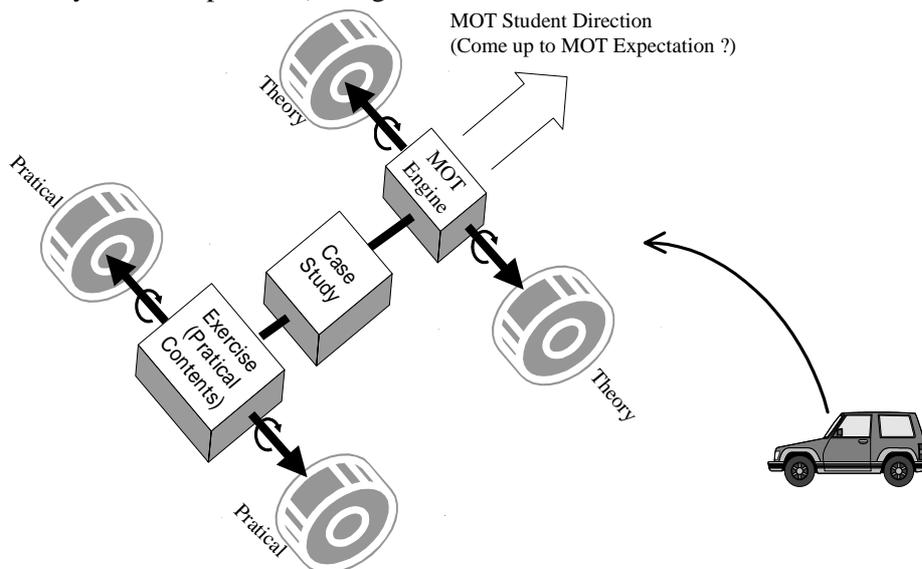


Figure 3. MOT Effective 4 Wheels Drive System

The core of the MOT is a new effective approach to the solution from the long-standing problem. We show the MOT effective 4 Wheels Drive system.

Participants to the MOT program in the University of Electro-Communications have gathered expecting "contents which are practically and truly helpful to the management of SMEs using technologies as a core."

Many ASPs and software produced by the information industry have become commodities. Nevertheless, that phenomenon has not ignited a motion among participating enterprises in MOT education to tie up with software houses or system integrators intentionally. Although it is up to participants after all, neither industry-university cooperation nor inter-enterprise cooperation can be expected to occur through education.

2.2 MOT Education Observed from the University Vantage

For Japan, which aspires to be a technology-oriented nation, students' dislike of science is an issue of concern. A capacity disparity will become remarkable after 2007; the declining birth rate is very serious as well. Intensified survival competition among universities is not a provincial issue any longer. The consolidation and integration of unpopular engineering departments has been accelerated. The merit of earning graduate degrees has also faded. Moreover, foreign students have come to constitute a large fraction of graduate students. Universities are exposed to such severe circumstances. Naturally, universities cannot cope without forming some intention of increasing student enrollments to include working adults. Admission to graduate schools will similarly not be encouraged unless the status of doctoral course graduates is improved.

It is necessary to promote industry (enterprise)-university cooperation. Furthermore, it is essential for universities to take measures to call back working adults as part of lifelong education. The support of engineers' career design, the fostering of specialists, and the cultivation of engineers who are creative and can tackle manufacturing issues might be candidates as introductory courses of MOT education for fostering technology-major executives in cooperation with enterprises.

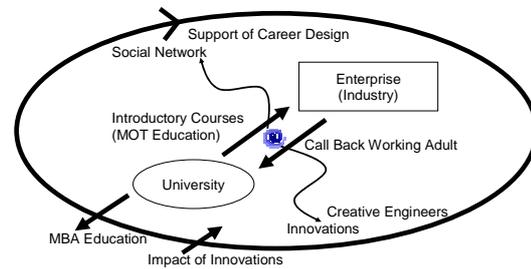


Figure4. Industry(Enterprise)-University Cooperation

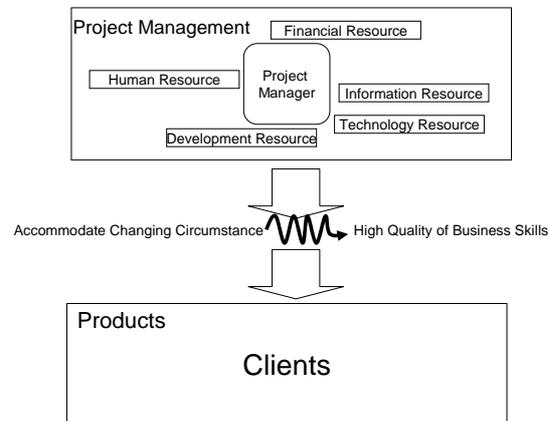
The MOT courses were originally established as independent graduate schools by the initiative of the Japanese Ministry of Economy, Trade and Industry. Now they must confront a daunting barrier. It might be necessary to reexamine their significance at primary establishment. Whereas business schools of MBA education were founded for the purpose of fostering business leaders, executives—so-called business leaders—are neither engineers nor administrators, but are instead independent professionals of management. The MOT education for fostering executives' understanding of technologies or technology-major executives does not necessarily have significance if one stands on this idea. Although the curriculum of business schools has included few technical contents so far, the significance of innovation has recently been revisited and technical contents have been increased. It is proof of increased understanding that technical approaches have become increasingly necessary as a result of the reconsidered impact of innovation to management.

3 Present State of MOT Education

3.1 MOT Education Desired by the Information Industry

One must first overcome a competition of technical capabilities (competition to acquire the latest technical capabilities) before discussing technology management in the information industry. Project managers like SEs (System Engineers) must also brush up business skills. A project manager must distribute limited management resources (human, development, financial, information, and technology resources) effectively for clients, and must implement project man-

agement successfully. Improving the quality of business skills will be an important key that divides the rise and fall of an enterprise. Enterprises that are obliged to decline often cannot accommodate changing circumstances.



Now it seems that everybody has noticed that no upcoming era can be created by the conventional catch-up type management. Bringing up MOT professionals is not necessarily reflecting this, although it is a subject appearing in university curriculum. Subjects highlighted in these several years are represented by the Project Management Office (PMO) including schedule control, quality control, and progress management. Project strategy theory is its advanced form. Many Japanese technologies, not limited to information industry-related technologies, such as manufacturing techniques, material technologies, and electronic devices, are considered to be comparable to those of the U.S. In some fields, such as biotechnology, software, communications, and medical technology, however, Japanese technologies are clearly lagging in strength. The background of this phenomenon might be the degradation of technology management capabilities. Improvement in technology management capabilities is exactly the well-spring of upcoming creativity.

3.2 Is MOT Education Alone Capable of Fostering Value-Creative Human Resources?

The author doubts it: the basis of management must be human. It is common to fostering education overall by which a human exists right in the center. Improvement of human capabilities is requested simultaneously in fostering of technology management capabilities, as well as reflecting technical capabilities to management. Japan escaped from the no-way-out feeling of "the lost

decade" through knowledge leadership supported with human capabilities.

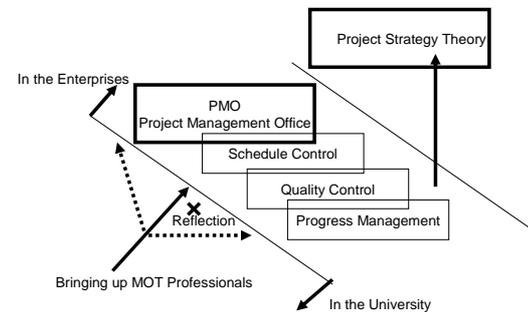


Figure6. MOT/PMO and Next PST

Nothing but measures to exercise leadership, clarify management resources, and improve project processes encourages the creativity of corporate value. Because of co-creation, corporate value can at last represent stakeholder value, collective strength, and the spirit of an enterprise. Fostering of value creativity is, after all, derived from strong leadership, which is also a goal of MBA education.

Japan is quite behind Western countries in respect of leadership. One must catch up in leadership capabilities first, before learning value creativity. "Visualization" is essential as a procedure to discern the outcome of practices of MOT education. An enterprise must establish a common recognition of innovation, that is, "what it wants to be, and what it wants to become", in practicing MOT education therein. This requires reversion to limited management resources, and continued analysis of the progress of innovation illustratively. Although it takes considerable time for large enterprises to make big decisions, its implementation might be possible with affordable management resources. SMEs should utilize sufficient MOT education, such as MBA education, to take risks for their survival. SMEs must challenge always boosting creativity and imaginative power, and finding certain goals, while continuously envisioning what they should become.

3.3 Limit of Incomplete MOT Education

Education in Japan has encountered an important turning point. Surely professional graduate schools, such as MBA and MOT, were born of

social demands. However, it is hard to say that sufficient conclusive discussion related to their educational contents has been carried out. Requisite credits for MBA and MOT courses in Japan are only 30–40, just 1/3 or 1/4 of those required in the U.S. Although enterprises might appreciate such pro forma education at first, they might not give it high regard with respect to its substantial effects that they expect because a huge gap separates the MOT education that enterprises desire and the MOT curriculum provided by universities.

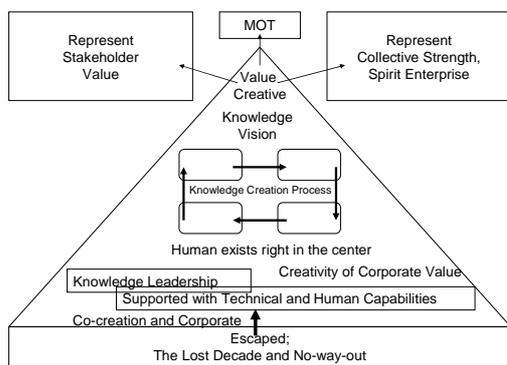


Figure6. Knowledge Leadership and Value Creative

It is unlikely that only 12 lectures costing as low as 120,000 yen for attendance will provide a magnificent effect even for selected personnel to advance industry-university co-operation. It is understandable that they must strive repeatedly to improve. However, SMEs cannot send their personnel endlessly to lectures while neglecting their workplace tasks. Even such selected personnel of SMEs can spare less than one month each year. Therefore, it is questionable whether MOT education that assures the continuity of lecture subjects and engenders the development of products or goods can be prepared during times when rapid development is sought. On the other hand, universities will not award a degree for education of less than one month per year. Their requisite must be at least two months per year for three years, i.e. six months in all. Consequently, it is clear that the demands of enterprises differ from the conditions of universities.

In conclusion, a double-featured education, for improvement in technology management capabilities and human capabilities supporting it, is essential. Short-time MOT education cannot anticipate product development that responds to direct innovation. The SMEs that gather for MOT

education will not assume that they can get important information for definite innovation, either. Cross-industrial association and industry-university cooperation will become necessary for spreading out their networks.

Then, what on earth is requisite of a MOT educational curriculum? What can be agreed upon by both enterprises and universities? It is evident that enterprises cannot compete in the world using only conventional technical capabilities in the future. The "How"-type problem-solving approach, which prevailed in the high-quality and mass production era, cannot respond to future globalization. Fostering of creative human resources with enhanced technology management capabilities should be requested. Such people can apply the "What"-type problem-solving approach of social needs. Curriculum organization along this concept will be requested. The author, for one, believes that today's MOT programs remain far from addressing this demand.

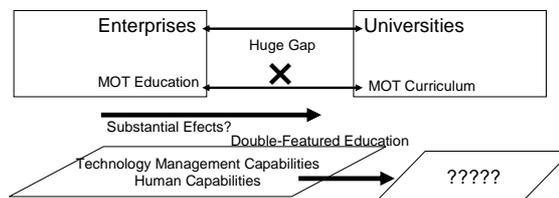


Figure7. Huge gap of the Enterprises-University Co-operation

4 Possibility of MOT Education – Education for Fostering Business Leaders

As an extreme case, MOT can be included in an MBA. In addition, MOT and MBA should not be considered as being of two opposite extremes. Fostering of professional executives is an essential issue for Japanese enterprises to remain undefeated in globalization. For that reason, MOT education should not be limited merely to enhancement of technology management capabilities. Business skills necessary for professional executives are software technologies depending on humans. An increasing number of faculty members of the University of Electro-Communications are from industry. Flexible

transfer among industry, academia, and government should be admitted, and professional, value-creative executives who can overcome future competition should be produced. The discussion of real enterprise management by a faculty with no experience in actual business cannot go beyond bounds of theory after all. The appearance of faculty from industries has ignited a period of great revolution from a traditional educational approach. As Japanese enterprises globalize, universities and industries must pursue a fundamental common subject together: fostering competitive human resources.

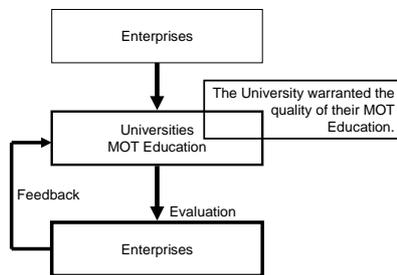


Figure9. The Quality of MOT Education

5 Concluding Remarks

To Conclude, I'd like to summarize my proposes by making nine remarks.

Remark1 MOT and MBA are Educations for Fostering Business Leaders

Remark2 MOT Education can be included within MBA Education for Fostering Business Leaders

Remark3 Probably we can't bring up

value-creative business leaders from business theory, but can bring up only from solving management theme

Remark4 If SEMs and university haven't fundamental education's philosophy together, Japanese SEMs can't survive in the competitive global world

Remark5 SMEs can't agree current MOT Education for the reason that SMEs can't obtain innovative idea

Remark6 SMEs can't afford fostering business leader through 2 years MOT Education, can prepare one or two month per year

Remark7 Really, can we be value-creative business leader through MOT Education?

Remark8 Really, can we obtain essence of value-creative leader from MOT Education?

Remark9 Generally we learn that human being get sense of business leader inborn, but we try to bring up value-creative business leader continuously

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