A Study On The Separation Of Ownership And Operationership Of Taiwan Railway Administration

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abstract: The separation of ownership and operationership indicates that railway industry should be divided into two separate entities, the ownership one responsible for investment and maintenance of rail infrastructure and the operationership one in charge of running rail transport. The latter is charged for using tracks by the former. Three alternatives were evaluated by using the Fuzzy Multiple Criteria Decision Making Method (FMCDMM) and Fuzzy set theory under the situation of the government owned and private enterprise operating. The result of analysis shows that the best alternative is a passenger company and another freight company.

1.INTRODUCTION

There were disadvantageous trends of domestic transport market for Taiwan Railway Administration(TRA) and there also existed problems on operational, financial and organizational affairs. In the future, the high speed rail will get involved to the revenue service and be sure to share the passengers of medium and long journey. They makes TRA from bad to worse. Accordingly, it is expected for the audience to transfer TRA to a private sector for operational efficiency of an enterprise in order to improve the existing difficulties and to alleviate the burden of the national finance. To exemplify the success of the Japan Rail transferring to private sectors and refer the trends which partial or total operation were transferred to private sectors in the world, the motivation was arisen to study the separation of ownership and operationership for (partially transferring to private sectors) TRA.

It is defined that the separation of trains and tracks is dividing rails into ownership and operationership which belong to different entities respectively. There are four combinations such as governmental owner with governmental operators, governmental owner with private operator, private owner with governmental operator and private owner and private

operator. Each combination has the advantages and disadvantages. However, TRA is an quite large and it is uneasy for private sectors to purchase all the assets. Thus, alternatives of the separation of train and track of the research was limited under the condition of governmental owner with private operator. For the government is the owner who has the exclusive right to the domestic transport. Also, it is unnecessary for the private sectors to purchase the assets and the will to invest is high and the risk is low. It is advantageous for the government to promote the policy.

The methods of the research comprised:

(1).Brain-Storming Method: After collecting related literature, the characteristics and constrains of the operation of TRA was understood. The brain storm method was used to determine the criteria of the evaluation.

(2).Fuzzy Multiple Criteria Decision Making Method （ FMCDMM ）: The AHP method is applied to use the questionnaire to survey the criteria for their preference. After the test, the weight of the evaluation will be calculated. The results of the questionnaire survey can derive the performance of the criteria and make the values of the performance.

After reviewing the literature, The problems of the operation for TRA were recommended and implemented without effectiveness. The crucial problem was lack of the spirit of the enterprise in governmental administrations which contains too many constraints. The second problem was TRA must pay a large amount of construction and maintenance costs for the railroad. That was really a heavy financial burden. Accordingly, the reasons why TRA should separate the tracks and trains to innovate the operation were not only trends in the world but also fair capability for TRA to compete with the highway.

2.THE ORGANIZATIONAL PROBLEMS OF TRA

Organizational hierarchy of TRA is the function of centralization and the spans of management are large and too many levels. The organizational problems and related issues derive from the organization are discussed below:

2.1 Problems derived from the jurisdiction

The jurisdiction of TRA is under the Transportation Division of Taiwan Provincial Government and its budget must be reviewed and supervised by the Taiwan Provincial Council. The existing problems are:

(1).Too many layers of management created the problems of bi-directional communication to the superior:

TRA is the third layer of entities in Taiwan Provincial Government. The reports from TRA shall be transferred by the Transportation Division. The duration to transfer the report will delay the proper time to make the decision and the officers in the Transportation Division are not able to understand the TRA's operations in detail. Thus, the practice required by TRA to promote the business could not be determined by the provincial government effectively and efficiently. The operational problems could not be solved and the proper coordination with TRA could not be responded the TRA's requirements either. Also, the Rail Law regulates that TRA shall be inspected by the Ministry of Transportation and Communication. The system set up a lot of

bindings and supervision to TRA.

(2).Few Authorization and Much Interruption:

Too much limit to TRA creates few right and heavy responsibility to affect the achievement of operational objectives, for examples, investment on facilities, decision of salaries and fare adjustment which are constrained by the laws and regulations. Also, for the considerations of foreign affairs financial policies, the locations to purchase cars are assign to given area or countries. That resulted in many types of trains, too long duration to purchase trains and difficulties to operate and maintain for problems on dispatching to shortage of trains in TRA. Thus, TRA could not only operate independently to follow the way of enterprises but also pursue the profits normally.

The issue that the jurisdiction of TRA is belong to Taiwan Municipal Government or Central Government argued between both of them for more than 40 years. If the jurisdiction could return to the Central Government, layers of management can be reduced and prevent from the problems of too many entities to supervise TRA. In addition, it is helpful for TRA to take care the issues of debts and retiring funds of staffs. Although there are advantages mentioned above for TRA returning to the Central Government, the low efficiency for governmental enterprises exists still.

2.2 Internal Problems in TRA's Organization

The system of centralized jobs and functions and lack of systematic planning for the investment and management of human resource shall result in the problems as below:

(1).Improper Job's Partitioning to be Lack of Flexibility and Efficiency:

All the decisions are determined by the Headquarters of TRA under the system of centralization. Too many divisions are too defensive on their own interests that is very difficult to integrate common objectives , knowledge, and to communicate each other. Accordingly, most of conflicts must be judged by the superior managers because there is no efficient staffs to be responsible for and the procedures for decision-making is not clear.

(2).Lack of Proper Communication among Units:

There is few proper communication among units in TRA. It results in shortage of control to the market. Once the communication among low layer of staffs delays, it is very difficult to achieve the coordination inside the organization. Also, the centralized management will make the operational activities lost creative, motive and flexible in a large organization such as TRA.

(3).Lack of Incentives for Staffs to Work:

The adjustment of salary of staffs is in accordance to the years worked rather than the working potential and the burden of works has no relationship with the years worked. Also, TRA did not study or emphasize the objectives to work and type of requirements for staffs. That makes the environment of works unable to be adjusted in proper time. That is the reason why the shortage of incentives have affect the mood to work for staffs.

2.3 Sub-conclusion

TRA exists the shortage of ability of responses in organization, insufficient authorization, shortage of independence of operation and the weakness to protect too much to staffs. In

the same time, TRA faces the prosperous development of air and sea transport, the construction of High Speed Railway in the future and is threatened by the limit of Railway act, labor law, etc.. The crucial reasons are that TRA is a governmental entity limited by not only a lot of laws and regulations but also many layers of authorities to constraint the operation. If the improvement were implemented following existing system, the problems is impossible to be alleviated and will likely result in other difficulties. Thus, innovation to the system for TRA, the problems described could be overcome. Before proposing the comprehensive measures to innovate the system, the research will introduce the successful experience of innovation as the examples to follow.

3. FOREIGN EXPERIENCE ON INNOVATION

When the loss of railroads appears, the accumulated loss will affect the financial expenditure seriously. It is possible to be the heavy burden of the governmental financial policy. Following the rising up of the activities to operate privately, the knowledge to be operated privately was emphasized. Referred to different level of operation privately and the order implemented in national railroads, the typical examples are introduced below:

3.1 Japan

For the proper geographical environment, the operation of railroads has the potential to make profit. The procedures to transfer the Japan Rail to operate privately were to partition the rail lines into 6 private companies in addition to Hsinkangsan to succeed to the assets and debts. For inferior conditions in Hokkaido, Skikoku, Kyushu, the private sectors succeeded to assets only excluding long term debts. Three operators in Honshu were charged usage fee to operate (separation of tracks and trains) Hsinkangsan railroad. The merchandise transport was operated by another one company.

3.2 Sweden

The innovation of railroad operational system in Sweden focused on free competition. The controlled monopoly was released rather than transferred to private sectors. The methods were to assist the operators who had interests to get opportunity to compete with each other after opening the permission of operations of main lines and local main lines. The railroad operators from Norway and Finland were invited to be the tenderers in order to set up a fair and free competitive environment. Also, SJ was given a big range of flexibility, in addition to usage fee (separation of tracks and trains), such as personnel and price adjustment independently.

3.3 German

Generally, the existing system was transferred to be a governmental company which was divided into long journey, short journey, commerce and civil & track divisions. After operating for a period, these four divisions were transferred to be four companies to operate respectively. Referring to the operational situation, the stocks were sold to the market to achieve transferring to private operators.

3.4 UK

Innovation of the railroad organization in UK was strong and straight. The business were partitioned into commerce department which was sold out to achieve the private operated and for getting loss in the future, the passenger department was open to bidding the permitted operationership for local railroads. The contractors shall pay the utilization fee to the department which owned the ownership of routes and layouts (separation of tracks and trains). The UK railroad experienced a large scale of innovation. The passenger business were localized and partitioned to be many types to permit the private sectors to operate. It reveal a complicated design and arrangement for the organization.

It was described that most of countries innovated their national railroad organization for the large scale of the structure of the organization to result in low efficiency of the operation and lack of flexibility to responded the changeable environment. To alleviate the issues of too large scale and too many idle staffs, the ways to innovate them were "transferred to company "transferred to private sector" in all countries. Although the measures, policies and duration were different, similarly, all of them set a staging objectives (mid-term) and final (long term) objectives. They hoped that increase the flexibility of the operation by means of decrease of limits and to achieve the requirement of the efficiency with competition.

4. ALTERNATIVES AND EVALUATIONS

After realizing the existing problems of the organization of TRA and experience on the methods to innovate the organizational problems in foreign countries. Referring the foreign experience, the research will set up alternatives suitable for TRA and evaluate them.

4.1 Alternatives for Separation of Tracks and Trains

Different alternatives were proposed depending on geographical locations and types of service for all railroads of TRA. All the possible alternatives were screened to determine feasible ones. The criteria to screen technically were suitability of train operation such as train running, line capacity, etc.. The profitability of the operators were considered also on the point view of the organization such as less disturbance among divisions to reduce the costs, the difference to be able to make profit among private operators can not be polarized to affect the willing to invest. According the criteria above, referring to the foreign experience, and for the integration of the business, the freight transport should be taken by one operator as a principle. Three feasible alternatives are derived, respectively, one passenger transport company, one intercity and one short-journey passenger transport companies and eastern and western passenger transport companies. The implementations are described in Table 1.

4.2 Criteria to Evaluate the Alternatives

The research set up the hierarchies of the evaluation referred to the related literature and utilized the brain storming method and the most proper layer on structure of evaluation finally. In addition that the technical criteria were considered to determine the implementation of separation of tracks and trains in TRA, the impacts on existing

environment must be less. Thus, three goals were set to meet the requirements, receptively, lest impacts on policy implementation, to upgrade the willing to invest for private sectors and upgrade the operational performance. After, 10 criteria were selected under each of goals.

Table 1 Implementation of Alternatives for Separation of Tracks and Trains

Alternative	1. One Passenger Operator	2. Intercity and Short-Journey Passenger Operators	3. Eastern and Western Passenger Operators
Implementation	1. The passenger transport is transferred to one operator including all TRA's existing railroads and sidings. 2. The freight transport is transferred to another operator.	1. The commuter transport for passengers is taken by one operator. 2. Other trunk line & sidings are operated by another operator. 3. The freight transport is transferred to another operator.	1. According to geographical locations, the roads are divided into eastern(and western trunk lines operated by two operators. 2. The sidings are dispatched to two new companies geographically. 3. The freight transport is transferred to another operator.
Advantages	1. There is no conflict with train operation. 2. The existing TRA staffs will not divided into two companies. 3. From point view of manpower, the alternative can achieve the scale of economy.	1. The different type of passengers can be provided with different service. 2. The two companies can compare each other to upgrade the operational efficiency.	1. There are few train operational conflicts. 2. The two companies can compare each other to upgrade the operational efficiency.
Disadvantages	1. There is no motive to improve the operation without competition. 2. The existing problems were difficult to be alleviated.	1. Layouts of fixed assets are difficult to be partitioned. 2. Ticket integration must be considered. 3. The schedule to transfer and line capacity must be negotiated. 4. The existing staffs are difficult to be partitioned.	1. Passengers transferred from one to another operator are difficult to be specified. 2. The difference of profit-making capability between eastern and western lines makes the unwilling to invest the low profitable line.

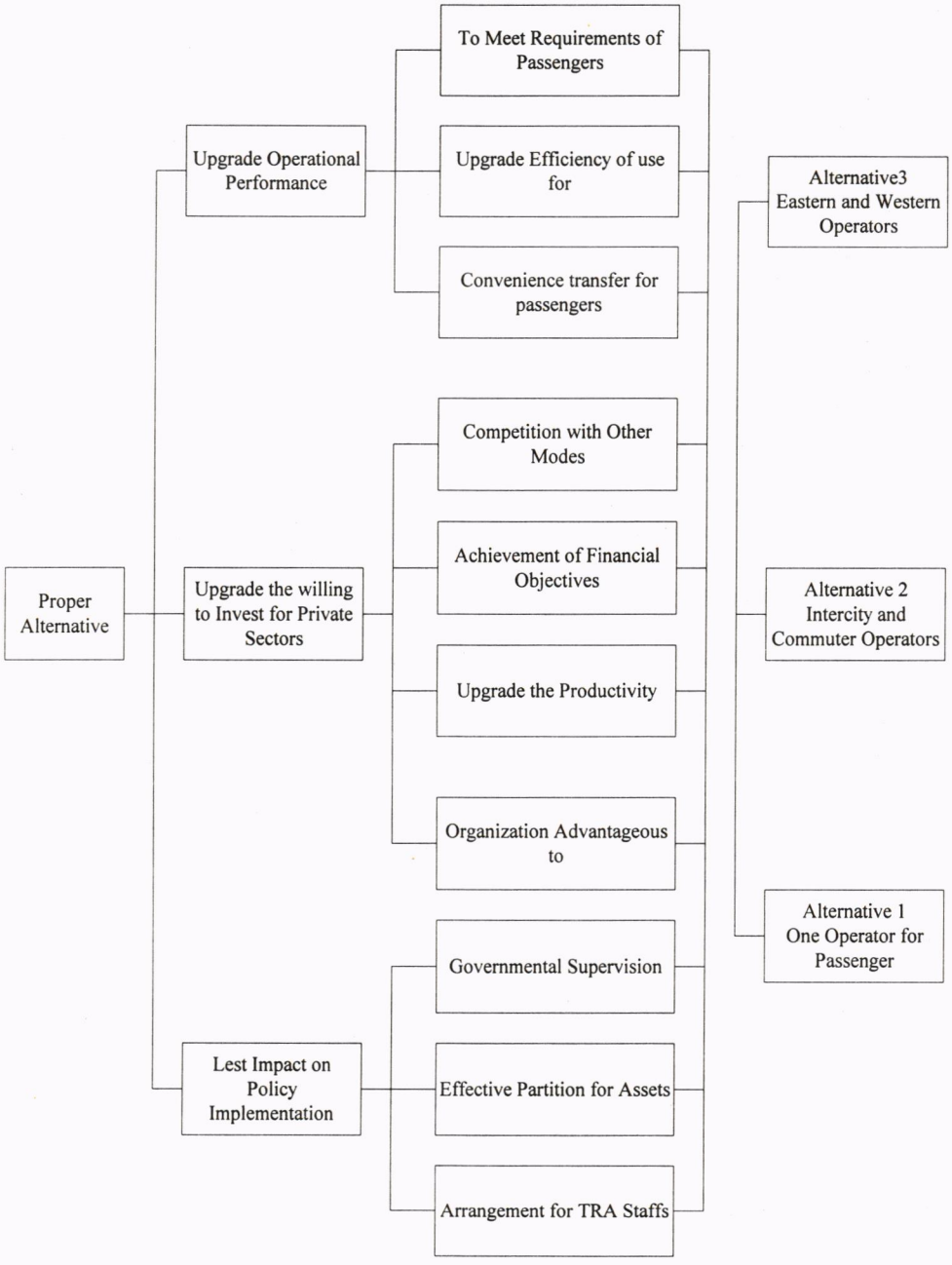

Figure 1 Evaluation Hierarchy for Separation of Tracks and Trains of TRA

4.3 Relative Importance Analysis on Evaluation Criteria

The research designed a questionnaire according to the evaluation layers in Section above. The effectiveness or degree to achievement of three alternatives to the evaluation criteria were surveyed and AHP method surveyed the relative importance among criteria. Three

population were survey, respectively, TRA, Officers, academic professors. Hopefully, the decision-making with group could rank the orders of three alternatives. Using AHP method to calculate the relative importance among evaluation criteria for each of evaluation groups, it was discovered that the responses of TRA and officers concerned about "lest impacts on policy implementation" and the academic professors emphasized "to upgrade the willing to invest for private sectors". For all the interviewee, "lest impacts on policy implementation"(0.3830) and "to upgrade the willing to invest for private sectors"(0.3322) were focused on. After further analysis to the relative importance of evaluation criteria with the evaluation groups, the TRA staffs concerned "the arrangement of TRA's staffs"(0.2335) and "assets partitioning and transferring effectively"(0.1271) and did not concern "capability to compete with other modes"(0.0647) and "Governmental Supervision"(0.0742). The officers were concerned about "the arrangement of TRA's staffs"(0.2233) and "organization advantageous to operate"(0.1111) but less about "upgrade productivity"(0.0640) and "upgrade layout's availability"(0.0678). The academic professors emphasized on "the arrangement of TRA's staffs"(0.1795) and "to meet requirements of passengers"(0.1474) but less on "upgrade productivity"(0.0662) and "capability to compete with other modes"(0.0701). For all the interviewee, "the arrangement of TRA's staffs"(0.2117) and "to meet requirements of passengers"(0.1130) were focused on but less on "upgrade productivity"(0.0700) and "capability to compete with other modes"(0.0714).

After the analysis, it is revealed that TRA's staffs were concerned about the impacts on the implementation of policies and less about upgrading the operational performance. That implies that the influence by the TRA's staffs must be focused on when the separation of tracks and trains is implemented. The officers were not only concerned about the impacts on the implementation of policies but also the willing to invest for private sectors. As for the preference of academic professors, in addition that they emphasized the impacts on TRA's staffs, it was concerned whether the operational performance would be upgraded or not for the operated system in the future.

4.4 Results of Evaluation

The research, by means of questionnaire survey, obtained the value (5 grade of scales of comparison) of alternatives on evaluation criteria evaluated by the interviewee's groups. The meaning of words was fuzzy and the fuzzy function used category 4 of "Scale of measure on comparison" (Chen, Hwang, 1992) to calculate the average of fuzzy value evaluated by the interviewee's groups. Finally, the simple added weighted method was used to compute the final evaluation value. The evaluation value for alternatives was shown in Table 2. The results of evaluation were quite uniform among groups and it is concluded that "One Operator for Passengers" was optimum.

Actually, the change of "one operator for passenger" to the existing situation was the lest among alternatives. It is scarcely unnecessary to adjust the structure of the organization and staff's arrangement. Comparing with the situation in foreign countries, the operational scope of TRA is smaller and it is unnecessary to partition the business of passenger's transport.

Table 2 Rank of Evaluation Results among Alternatives

Groups / Ranks	TRA	Officers	Academic Professors	All the Interviewee
Alternative 1	One Operator for Passengers (0.6346)	One Operator for Passengers (0.6267)	One Operator for Passengers (0.6660)	One Operator for Passengers (0.6433)
Alternative 2	Two Operators Specified Eastern and Western Passenger Transport (0.4687)	Two Operators Specified Eastern and Western Passenger Transport (0.5284)	Two Operators Specified Eastern and Western Passenger Transport (0.5700)	Two Operators Specified Eastern and Western Passenger Transport (0.5205)
Alternative 3	Two Operators to Share Intercity and Commuter Passenger Transport (0.3975)	Two Operators to Share Intercity and Commuter Passenger Transport (0.5070)	Two Operators to Share Intercity and Commuter Passenger Transport (0.4823)	Two Operators to Share Intercity and Commuter Passenger Transport (0.4569)

Note: Evaluated Points in Parentheses

5. PROBLEMS AND MEASURES TO IMPLEMENT THE POLICY OF SEPARATION OF TRACKS AND TRAINS

Referring the literature reviewed, the critical issues shall be alleviated in the process of transferring from governmental enterprises to private operators. The issues comprise staffs, limit of law and regulation and processing of debts and described below.

5.1 Issue on Staffs

To promote the policy of separation of tracks and trains in the future, although TRA went through a screening for their employee, the staffs who worked in TRA before in the new company can not be hired by the private operator and shall conflict with the government. According to the experience in the foreign countries, it can be overcome by means of encouraging the retirement earlier or transferred to other governmental office. Also, the staffs hired by the private operator shall not be fired until three years. That can avoid from the risk to be unemployed and can guarantee the independence of operation for the private company.

5.2 Limit of Laws and Regulations

In case of government owned and private operated to implement the separation of tracks and trains, the multiple items of operations to set the opportunity to get profit. However, according to No. 38, the Railroad Law, the local operators and private operators can not operate other subordinate business unless approved by the Ministry of Transportation and Communication. Also, referred to No. 2, the Rules to Operation of Railroads, the scope of

subordinate business for railroads shall be regulated by Item 5, No. 21, the Railroad Law that the business shall raise up the prosperity of revenue service of railroads such as the restaurant to serve the passengers. In order to expand the space to operate for private sectors and not to affect the profit for limits of the laws, the related laws and regulations mentioned above should be modified to upgrade the willing of investment.

5.3 Processing of Debts

The cumulated loss is approximated to NT$ 39,000,000,000 up to year 1994. To get rid of returning debts with other debts and prevent from the burden of all the people, the land, which is not used for business, owned by TRA can be sold. So far TRA was approved to sell the houses and lands owned by TRA themselves. A missionary organization "Missionary Group to Proceed TRA's Houses and Lands" in TRA was set up to be responsible for proposing the processing of houses and lands. It is necessary to expedite the processing of Houses and Lands to alleviate the burden of interests.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

1. For TRA faced the factors of internal and external disadvantages, there was opinions to transfer to private sectors operated. The research referred to the trends in the world and separation can be the staged objectives before private sectors operated. It was hoped that the separation of tracks and trains can alleviate the existing problems of TRA.
2. TRA utilized the centralization of jobs and functions. It makes the weakness such as lack of responding ability to changeables, insufficiency of authorization, lack of independence of operations, too much protection to their staffs. Even if the operational items were adjusted, the TRA can not be free from bindings. Thus, the organization should be innovated.
3. The innovation of organizations in foreign countries were achieve by means of transferring to companies or private sectors operated. Although the duration, measures or methods of the implementation for innovation, the middle innovated stage utilized the separation of tracks and trains and final objective was transferring to private sectors operated.
4. The result of evaluation for the separation of tracks and trains was one commercial and one passenger transport private operator respectively. The alternative "one passenger transport operator" changed the existence the lest among others, was not necessary to adjust the overall organization and the manpower. Also, comparing to the scale of the system in foreign countries, the scope of the operation for TRA are smaller. Accordingly, it need not to partition the business of TRA.
5. To promote the separation of tracks and trains, the critical issues shall occur such as employee, limits of laws, debt processing. The issue of employee can be solved by retirement earlier or transferring to other governmental office. The permission to private operators to carry on the business with multiple scopes of the operation can alleviate the limits of laws and regulations. It is recommended to modify the related laws. To prevent the cumulated debts from national financial burden, the lands of non-business use should be proceeded to return the debts.

6.2 Recommendations

1. For TRA's loss were a heavy burden of governmental finance, it revealed that the innovation on TRA's operation can not be delayed any more and the implementation on the separation of tracks and trains should be taken over as soon as possible.
2. The research studied the primary analysis of the separation policy of tracks and trains only. Further study can be proceeded to the processing of existing staffs and agreements between the government and private sectors to implement the research.

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