

Seeking Measures to Reinforce Accessibility of Fire Fighting Facilities Engineer to Practical Business: Focusing on Information Asymmetry

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Abstract: In this study, to identify the problem between the contents used in the current field practical business and the qualification system and to foster the talents to input in the field business immediately with the field practical business-oriented education, they were examined in the perspective of the adverse selection, moral hazard and the principal-agent problem, which are the information asymmetry. In the perspective of adverse selection, the problem of question design and the difference with the field practical business were presented. For their solutions, the measure to select the question designer having abundant field experience and the measure to introduce the portfolio system after practicing certain period were suggested. In the perspective of moral hazard, the provision of the qualification rental penalty and the unexpected crackdown would be expanded. For the principal-agent problem, the problem of poor fire protection facilities construction and supervision was presented and the solution that it is necessary to reinforce the provision of penalty and the monitoring and supervision through the multiple agent was suggested. Through this study, it was observed that it is necessary to guarantee the safety of the people and to check other qualifications related to fire protection. In addition, it is expected that this study would be utilized to reinforce the fire fighting facilities engineer's accessibility to the field practical business.

Keywords: Fire fighting facilities engineer, Information asymmetry, adverse selection, moral hazard, principal-agent problem

1. Introduction

As recently, the buildings are getting larger and higher, to prevent the fire and to protect the life and body of the people and the property focusing on the early suppression in case of fire, the qualification system is being implemented. [A] Mr. XXX, who succeeded to be employed with the certificate acquired by preparing for 1 year, said in the interview 'I should learn the job all over again as soon as I entered the company. It did not help only with the memorization-oriented knowledge. [B] In addition, an auditor claimed in relation to issue the license to the fire fighting officer carried out the duties such as general administration, rescue, first-aid, fire fighting, etc., that they are carrying out their duty in the circumstance that they do not have proper specialty. [C] They say that certain certificate is the certificate that is not known in the industry and since the examination consists of written test and the practical skills only, they can acquire the certificate without experiencing the field. However, relevant experts emphasize that "in the field, the practical business skills are important than the certificate". [D]

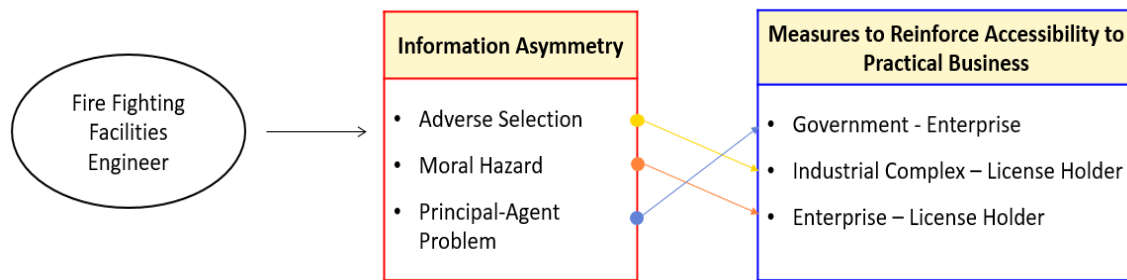
In the research on Improvement of Practice-Oriented Fire Fighting Engineer Training Course and Promotion System by Choi Dae-Kyu (2017) [E] and the research on the problem in the design and supervision business by Cha Jong-Ho (2015) [F] claimed that as the quality of the building is deteriorated due to poor fire protection design and supervision, the base system of design and supervision should be established to enhance the safety of the people. In the research by Kong Ha-Sung (2019)[G] claimed that since the enterprise appointed the license holder only, the economic system is limited. And asserted that, as the license holder neglects his/her duties, their skills are declined. The research by Park Jang-Soon et. al., (2017)[H] claimed that since they received the standardized education to acquire the certificate, the additional education on the skills that the beauticians think it is important in the practical business or the education having association with field practice is required.

As such, in the researches related to fire fighting, the research on the problem in the design or supervision business and the measures on the solution occupied the most but it is hard to find the research that analyzed the matters regarding the qualification of fire fighting facilities engineer in the asymmetric aspect.

Therefore, this study was intended to solve the problems to foster the talents to be able to apply the practice-oriented education to identify the problems by comparing the details used in the current field practice and the qualification system and to make the practice-oriented education.

2. Research Model

Figure.1 Research Model



3. Information Asymmetry

Information asymmetry refers to the situation that a part of important information is known to party of the transaction but it is not informed to other party (Kim Tae-Yoon, 3007). That the information asymmetry exists in the market refers to that the transaction is made in the state that the information asymmetry exists when the buyer and seller do not possess same information. The market models formed in the field of economics and the business administration are basically based on the completeness of information. For example, it is that the buyer and seller make a deal having the complete information on the quality or appropriate price, etc. of the product to sell or buy. However, in the actual market, it is common that the information asymmetry among the market participants or uncertainty exists.

In the democratic society, there are always unfair things, among which the unfairness hard to solve the most is the distribution of information. Like there is the case that I know the information that others don't but all the people know the information that I don't, since the information cannot be measured, it is hard to distribute fairly.[I] To acquire fire fighting facilities engineer, one should pass the examination implemented by Human Resources Development Service of Korea. The examination for Firefighting facilities engineer divided into written test and practical skill test and the written test is carried out with multiple-choice question and the practical skill test is carried out with the writing type. as such, memorizing the answer of the question is more common rather than understanding the question when preparing the test. Although the examinee studies hard to acquire the license thinking that if he/she acquires the license, the efficiency in the field practical business would be higher, the exam questioner makes the questions according to exam question criteria rather than the details required for field practical business. Those who passed the exam said that the theory learned through the book is different a lot from leaning checking by themselves. [J] As such, it is the reality that once one got into the field business, he/she encounters the difficult situation that it is hard to associate the theory with practical business. Therefore, the issue of information asymmetry becomes the subject of important analysis.

3.1. Factor Causing Information Asymmetry

3.3.1. Adverse Selection

The adverse selection issue starts from the information asymmetry. In this sense, the most simple situation of the asymmetry refers to the case that while the one party of the transaction has many information, the other party does not have any information. The one who does not have any information is highly likely to make a deal although the one who has many information has the characteristic that he does not like the most.[K] That is, in the position of person who lacks the information, he/she makes the unfavorable choice. Defining the adverse selection with the dictionary terms, it is the act to select what is disadvantageous to the other party to take the advantage, and it is the phenomenon occurred because the information possessed by supplier and customer are different.[L]

3.3.2. Moral Hazard

The moral hazard can be considered differently in the meaning of economics and business administration. In this article, the meaning of economics is used. The moral hazard in the economic sense is one of the market failure appeared due to information asymmetry. That is, it is the phenomenon appeared when the amount of information is different during the transaction or entering into the contract. However, among them, it appears when the information on certain act is hidden. In the concept of moral hazard, it does not include the good or evil. Although it uses the word 'Moral', it is the term meaning that in spite of mutual agreement, the act different from the

agreement is made. That is, in the situation of information asymmetry, it is the key that making a choice that one can be distinguished even though it may cause the damage to the others.[M]

3.3.3. Principal-Agent Problem

The principal-agent problem is caused from the information asymmetry. In other word, it is the origin of the problem that while the agent knows him/herself very well, the principal does not know what the agent thinks. However, the interests of principal and the agent cannot always be coincided. This is the problem when the agent does not act according to the objective of the principal but acts for his/her own purpose. This has similar characteristics as the adverse selection but in case of the principal-agent problem, it has the characteristics referring to ‘The hidden action’¹, that is, the situation after the contract. It refers to the case that it occurs after the contract consigning his/her matters to the others.

4. Actual Condition of Firefighting Facilities Engineer’s Accessibility to Practical

The actual condition of the firefighting facilities engineer’s accessibility to the practical business will be examined in the perspective of adverse selection, which is the factor of information asymmetry, in the perspective of moral hazard and in the perspective of principal-agent. The actual condition will be analyzed by discussing the relation between Human Resources Development Service of Korea (hereinafter refers to ‘Corporation’ and the license holder, which is the major fact revealed in the actual condition of firefighting facilities engineer’s accessibility to the practical business in the perspective of adverse selection, by interpreting the relation between the enterprise that hire the license holder and the license holder in the perspective of moral hazard and the relation between the government and the enterprise in the perspective of principal- agent.

4.1. Perspective of Adverse Selection: Difference between Questions in Test and Field Practical Business

In the perspective of adverse selection, it is intended to contemplate the perspective of both by taking the corporation and the license holder as main agent of economic activity. For the government, the law clearly states that the minister of labor requests more than 3 test organizers by item of national technical qualification exam when implementing the written test and practical skill test but appoints the person who has abundant industrial field experience preferentially. [N] However, in the qualification of test organizer, it is observed that the people who are working as profession occupy the most rather than the people who have abundant industrial field experience. [O]

In the research by Kim Duk-Gi (2004)[P], he claimed that due to the school education course-based criteria of making questions, the disjunction with the field manpower demand is caused. He asserted that therefore, the criteria of making questions should be improved toward the direction so that the form and the evaluation contents can secure the reality in the field. However, since the criteria is based on the school education course, there is a difference between the questions in the test for firefighting facilities engineer and the field practical business due to theory-oriented questions not the practical business-oriented questions.

4.2. Moral Hazard: False Career due to License Rental

In the perspective of moral hazard, it was intended to examine the perspective of enterprise and the license holder taking them as main agent of economic activity. Currently, lots of problem occurs by the national technical license rental. [Q] Engineer fire fighting facilities is not an exception.[R] Viewing the false career by the qualification rental in the perspective of moral hazard, the enterprise hire the license holder through the license and relevant career. However, the enterprise does not know if the career of license holder is the career generated by the qualification rental. And then, it can be considered that the enterprise’s exploration to observe the ability of license holder is not easy. Lee Jung-Goo (2011) [S] claimed that as the construction engineer license rental is the cause of poor construction, it becomes a serious problem. However, through the press release that in one university, the name case of qualification rental broker can be found easily, he pointed out that both the school and the student do not feel the seriousness of the rental is the bigger problem. In addition, he asserted that the inspection system to verify if one is working permanently should be implemented.

¹ Hidden action appears when the other party cannot observe the action of one party after the contract and refers to the information asymmetry occurred when one party acts not conformed to the contents of contract after the transaction contract but the other party cannot observe such action. (Kim Tae-Yoon, 3007)

4.3. Principal-Agent Problem: Cause the poor construction of firefighting facilities and firefighting construction supervision

In the perspective of principal-agent problem, it is intended to contemplate the government and the enterprise in the perspective of both taking them as main agent of economic activity. It revealed the fact that the firefighting administration is poor due to safety frugidity. There are lots of businesses that were condemned as non-conformed previous year and condemned as the non-conformed in following year. In case of public enterprise, they showed the aspect that they neglect the fire prevention management such as they change the facilities related firefighting at their discretion, they omitted the fire detector, etc. [T] Cha Jong-Ho (2015) [F] claimed that the since the performance procedure of the fire protection facility design business and supervision make the quality assurance hard, the responsibility and authority of the supervision business are not granted clearly. In addition, if the unfair procedure that constructor of fire protection facilities selects and contracts the supervisor continues, it leads to the poor supervision declining the fire protection quality. Therefore, to prevent the problem generated by the poor construction and supervision, the legal regulation should be reinforced.

5. Measures to Reinforce Firefighting Facility Engineer's Accessibility to Practical Business

5.1. Perspective of Adverse Selection

5.1.1. Selection of a test committee with extensive field experience

Among the question designers appointed by Human Resources Development Service of Korea, the expertise of those who are working as professor is not insufficient. However, theoretically, it is thought that they have high expertise in the theoretical knowledge as a person who educates the students but the field experience is not sufficient. Therefore, specifying the provision of question designer as 'Appoint one or more persons' can reduce the problem of conflicting the test question and the field experience rather than providing it with the words less accurate 'appoint preferentially'. In addition, if the working-level staff having abundant field experience becomes the question designer, the ability of applying the knowledge learned theoretically in the actual field immediately can be increased and the ability to understand the field can be increased.

5.1.2. Introduction of a portfolio system after a certain period of practice

Currently, the fire fighting facilities engineer in Human Resources Development Service of Korea is verified both with written test and practical skill test. If there is difference between the questions in the test for fire fighting facilities engineer and the field practice, it is important to accumulate the field practice experience. Like completing the field experience period in the field practice institution in order to acquire the qualification of social worker, the difference with the field practice can be reduced if the fire fighting facilities engineer reached to understand the field situation when acquiring the qualification by experiencing the field practice before acquiring the qualification through the method that the fire fighting facilities engineer completes the determined practice period in the related institution and submits the portfolio to the Human Resources Development Service of Korea.

5.2. Perspective of Moral Hazard

5.2.1. Introduction of a portfolio system after a certain period of practice

Currently, if the fact of qualification rental is uncovered, the qualification of whom rents the qualification is cancelled and he/she cannot apply to the qualification test. In addition, the person who rents the qualification, the person who borrows the qualification or the broker who arranges the qualification rental are charged with the imprisonment less than 1 year or penalty less than 10 million won. [U] Besides that, if the national technical qualification and the firefighting facilities engineer career book is rented, it is charged with 3 million won of penalty. [V] However, comparing the risk to be borne by the enterprise by hiring the person with false career due to qualification rental, current penalty is not much. It is necessary to reinforce current penalty as the imprisonment less than 5 years or the penalty less than 50 million won.

5.2.2. Expansion of Unexpected Inspection

Currently, since the check if the license holder is actually working is not sufficient, there are many cases that the qualification rental is made, for which Human Resources Development Service of Korea is receiving the report on the person who rents the qualification illegally. Nevertheless, the qualification rental is made tacitly and the crackdown for that is not enough. In addition, since the authority of investigation is unclear, the investigation is not made clearly. Therefore, systematic and clear investigation is necessary by clarifying the authority of investigation and the qualification rental should be blocked by expanding the regular crackdown or permanent

crackdown by enacting the provision of evidence to be able to identify the service of the firefighting facilities engineer accurately.

5.3. Perspective of Moral Hazard

5.3.1. Strengthening The Penalty Rules for Insolvency Construction and Supervision

As such, for the problem occurred by the poor construction and poor supervision due to safety frugidity, the regulation should be reinforced. Current law states that the correction or business suspension can be charged to the relevant person by determining the period less than 6 months if the self-inspection for the firefighting facilities, etc. is not performed regularly. [W] However, they should be perceived that the safety management, inspection, etc. are important through the charge of penalty or fine nor the correction or business suspension.

5.3.2. Supervision of Surveillance through multiple agents

When registering the business, for the required technical personnel, it provides ‘1 or more persons’. That is, it refers that various persons can be appointed as technical personnel. However, since actually, it is filled with minimum standard, it does not illegal, and the enterprise hires the minimum person for the reason of cost reduction. However, since it is hard to monitor only with the minimum personnel, it is necessary to reinforce by increasing the technical personnel to minimum 3 persons.

Table 1 summarizes the actual situation and measures to strengthen practical accessibility from the government and the enterprise side, the industrial complex and the qualification acquirer side, and the company and qualification acquirer side.

Table.1. Summary of measures to strengthen the practical accessibility of firefighting equipment engineers

Information Asymmetry		Actual Condition	Measures to Reinforce Accessibility to Practical Business
Cause of occurrence	Relation		
Adverse Selection	Industrial Complex – License Holder	Different between Questions in Test and Field Practice	Selection of a test committee with extensive field experience.
			Introduction of a portfolio system after a certain period of practice
Moral Hazard	Enterprise – License Holder	False Career due to Qualification Rental	Enhancement of dine rules for license rental
			Expansion of Unexpected Crackdown
Principal-Agent Problem	Government - Enterprise	Cause the poor firefighting facilities construction and supervision	Strengthening The Penalty Rules for Insolvency Construction and Supervision
			Supervision of Surveillance through multiple agents

6. Conclusion

In this study, the actual condition of the firefighting facilities engineer's accessibility to the practical business was identified through the perspective of adverse selection, moral hazard and the principal-agent problem, which are the information asymmetry, and the reinforcement measures were sought.

First, in the perspective of adverse selection, there was the problem between the corporation and the license holder that as the test questions are made based on the school education course, the test questions are different from the field practical business and to solve this problem, the measure to select the working-level staff as the question designer and the measure of verifying through the portfolio by adding the field practice course were suggested.

Second, in the perspective of moral hazard, since exploring the ability of the license holder is not easy if the enterprise hires the license holder without knowing if the career of the license holder is false career, there is problem about the false career due to qualification rental. To solve that, the measure to reinforce the provision of penalty against the qualification rental with the provision of maximum penalty and the measure to enact the provision of evidence that can judge clearly if he/she is working actually by expanding the regular crackdown or permanent unexpected crackdown were suggested.

Finally, in the principal-agent problem, there are many enterprises that were condemned as non-confirmed but condemned as non-confirmed again in the following year. So, there is the problem of causing the poor fire protection facilities construction and supervision between the government and the enterprise, and to solve that, the measure to reinforce the provision of fine with the provision of penalty and the measure to increase the minimum assistant personnel of 1 or more to 2 or more personnel were suggested.

Through this study, it was intended to secure the safety of the people and to check not only the qualification of firefighting facilities engineer but also other fire protection-related qualifications. In addition, it is expected that this study would be used as research data to reinforce the firefighting facilities engineer's accessibility to practical business

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