

범죄예방 환경조성 시설·기법의 효과성 분석 연구

A Study on the Effectiveness of CPTED Facilities and Techniques

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SUMMARY

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Central and local governments have increasingly used various facilities and techniques such as CCTVs, lights, and emergency bells to prevent crimes in residential areas. However, there is still a lack of evidence to prove the crime reduction effect of those facilities and techniques, which could lead to inefficient budget execution of the CPTED projects. In this context, this study aims to quantitatively verify the crime reduction effect of CPTED facilities and techniques at the macro and micro space level, and to provide implications for the effective installation and operation of such facilities and techniques.

CPTED facilities and techniques are classified into three categories – crime prevention facilities for street, crime prevention facilities for building and environmental design techniques – according to the installation location and characteristics of them. In this study, the effectiveness of crime prevention facilities for street is analyzed at the macro and micro space level(Seoul and Gongneung-dong of Nowon-gu). On the other hand, the effectiveness of crime prevention facilities for building and environmental design techniques is verified at the micro space level(Gongneung-dong of Nowon-gu). For these analyses, open-street CCTVs, street lights, emergency bells and reflectors are selected as crime prevention facilities for street. In case of crime prevention facilities for

building, it includes CCTVs for building, lights for building, automatic door-locks, mirror sheets, security covers for gas pipe line, CCTVs for parking lot, lights for parking lot and retroreflective sheets. In addition, wall-painting and logo floor lights are selected as environmental design techniques.

The analysis at the macro space level was conducted in two ways. Firstly, the number of crimes before and after setting up open-street CCTVs in 2017 was compared using t-test. The result showed that there was reduction of five major crimes(all, night), theft(all, night), and violent crimes(all, day, night) between 2016 and 2018 within the visible range(a radius of 100 meters) of newly installed street CCTVs. Secondly, multiple regression analysis was conducted to verify the crime reduction effect by considering local environmental factors. According to the analysis, street lights had a significant effect on the reduction of five major crimes and violent crimes during night-time hours. However, in the case of open-street CCTVs, there was no statistically significant crime reduction unlike the result of t-test. Emergency bells also showed no statistically significant effect on crime.

In addition, the regression analysis showed the effects of local environmental factors on crime as follows. In terms of population and social factors, living population or the ratio of foreigners had a positive impact on crimes – five major crimes, theft and violence, while population per household had a negative impact on crimes. It was also showed that population density or divorce rate affected violence positively, and net migration rate affected theft at night positively. Furthermore, in the case of economic factor, it was analyzed that the number of basic livelihood recipients per thousand people had a positive impact on five major crimes and violence. Finally, in terms of physical factors, adult entertainment businesses had a positive impact on five major crimes, theft and violence, while accommodation and restaurant business rate had a positive impact on five major crimes, theft and violence only at night.

At the micro space level, a field survey of the CPTED project areas in Gongneung-dong was conducted, and based on the results, it was investigated whether crime has decreased after setting up CPTED facilities and techniques. Furthermore, binomial logistic regression analysis was conducted by considering parcel environmental factors.

With regard to crime prevention facilities for street, it was found that five major crimes

and 112 reports decreased in the parcels within a 20-meter radius of newly installed (or replaced) open-street CCTVs, street lights, emergency bells or reflectors. However, as a result of binomial logistic regression analysis, only street lights significantly affected the decrease in the number of 112 reports. This is consistent with the result of multi-regression analysis at the macro space level, suggesting that the proper installation of street lights may be effective in reducing crimes at night. On the other hand, contrary to the research hypothesis, CCTVs for building has a positive impact on 112 reports at night. This result needs to be interpreted as a result of the fact that CCTVs are more frequently used in the building with high possibility of crime and disorder due to frequent visits by various people. In the case of crime prevention facilities for building and environmental techniques, it was found that the number of five major crimes has decreased since installation of security covers for gas pipe line, mirror sheets and wall-painting. However, the results of binomial logistic regression analysis showed that security covers, mirror sheets and wall-painting had no statistically significant effect on 112 reports reduction, while automatic door-locks and CCTVs for parking lot had statistically significant effect on 112 reports reduction.

According to this study, there are several considerations for using CPTED facilities and techniques effectively. First, in order to enhance the crime prevention effect of open-street CCTVs, it is necessary to analyze the installation status of existing CCTV and set up them based on this. Second, there is a need to introduce lighting plans more actively in the CPTED projects, as the effect of street lights decreasing crimes and 112 reports at night was proven. Third, since the effectiveness of building door-lock system was proven, it needs to expand the target of legal obligation installing the system from apartments more than 100 households to low-rise housing. Fourth, it could be considered using security covers for gas pipe line, mirror sheets or wall-painting as a method for crime prevention, as a reduction of five major crimes was found in the parcels those facilities installed. Finally, it is necessary to induce installation of CCTVs for parking lot in the private sector through promotion and education to the building owners.

Despite several limitations, this study is valuable in that it tried to analyze the effects of CPTED facilities and techniques quantitatively using large-scale data. Furthermore, it is meaningful the crime reduction effect of newly installed open-street CCTVs and street

lights was proved. This research also has great policy implications in that it proved the crime reduction effect of street lights and automatic door-locks for realizing natural surveillance or access control among CPTED strategies.

Keywords :

CPTED Facilities and Techniques, CCTV, Lighting, Emergency Bells, Crime Reduction Effect, CPTED