Summary

Introduction
This report gives an account of the development of an analytical instrument to improve decision-making on measures against criminality and nuisance. The project was commissioned by the Dutch Ministry of Justice, Research and Documentation Centre, and has been carried out by Decide, a research- and consultancy firm linked to the RUG, University of Groningen.
The decision-making on measures against criminality and nuisance is difficult for various reasons. First of all, the effects of these measures are generally uncertain and will depend on the context. Secondly, the value of 'safety' is difficult to quantify, which makes it complex to compare it with the costs of the measure under consideration. Thirdly, measures have side-effects, social and economic, which should be taken into account when different measures are compared on effectiveness. Finally, the decision-making is complicated by differences in interests of the actors involved: police, politicians, civilians, companies and shopkeepers may have differences in priorities and preferences, which will lead to different choices.
All this complicates the evaluation of the measures considered.
The challenge for the researchers were to construct a suitable evaluation instrument that would integrate the various effects of measures - on safety, costs and on social and economic side-effects - in order to facilitate an overall comparison between measures. The instrument should in particular be able to handle the uncertainties, which are inherent in this field of decision-making. Furthermore, it should create a platform for discussion between actors that participate in the decision-making.

For example, the instrument should be suited to evaluate measures on
- Security of business parks,
- Prevention of shoplifting,
- Security of office and shop buildings,
- Prevention of steeling trucks.

Eventually the instrument should be used – on various policy levels – by government institutions, private organizations and companies. This means that it has to be user-friendly and also that the cost of applying it should be limited. Furthermore, the instrument should make the evaluation process transparent for the user: he should understand the impact of changes in the data input on the result of the evaluation.
Summarizing, the evaluation instrument should:

1. Facilitate the evaluation process of measures.
2. Improve the quality of the decision-making process.
3. Make the evaluation more transparent.
4. Facilitate collective decision-making.

Approach
First of all a scan has been made of relevant literature of various theoretical approaches that could be applied, especially multi criteria analysis (MCA), theories on decision-making in general and expected utility theory. At the same time experts on criminality were interviewed in order to get insight into the use decision-makers could make of an evaluation instrument, and in what situations and circumstances.

Then a simple model was constructed, which was subsequently tested in an actual case. It concerned the decision-making on security measures for a new business park in the city of Groningen. During the test the model was adjusted and further simplified. Overall, the test was a success. The model was then transformed into a simple MS Excel spreadsheet.
The instrument was tested in three more cases. In two of them this proved to be a success. In the third case the model wasn't of any use. The primary goal in that case – prevention of arson – was that compelling, that there was no real need for an instrument that helped in choosing the optimal measure: any measure that enhanced safety would do, and money was not an issue. In two of the four test cases the data-input was generated and discussed by a team of experts who were involved in the actual cases.

The instrument
The eventual instrument has been based on a combination of MCA and decision-making theory. The evaluation of security measures is approached as a selection of optimal measures, given a list of criteria on which the measures has direct and indirect effects, either positive or negative valuated. Examples of criteria are: 'increasing safety', 'increasing the attractiveness of a shopping centre', 'initial costs of the measure', 'structural costs of the measure', 'affects on privacy', 'public support for the measure', 'demands on police capacity'. The integration of the valuation of the different effects implicitly brings forward a cost-benefit evaluation, be it in terms of value in stead of money.
Applying the instrument, the user should:

1. Specify the alternative security measures.
2. Specify the criteria considered important with which the measures are evaluated.
3. Determine how important these criteria are towards each other.
4. Estimate the effect of each measure on each of the criteria.
5. Valuate the effects, according to the amount of effect and the importance of the criteria.
6. Determine the measure(s) which are optimal in terms of total value.

An important reason for applying MCA is that with this technique it is possible to integrate unlike quantities by a process of valuation, for example 'effects on safety' and 'costs'. The second reason is that MCA doesn't place great demands on quantification, unlike financial cost-benefit analysis. Furthermore, with cost-benefit analysis one determines the optimal alternative in terms of *objective* costs and benefits. Within MCA the *subjective* perspective and interests of the user is taken into account by the valuation of evaluation criteria. So the analytical pretensions of the two methods are different. MCA is a decision-making support tool: the evaluation process is structured in a way that all relevant factors become transparent.

Application step by step
Question
Policymakers within the (local) government or companies are considering a number of measures to increase safety in some area or situation, or measures against specific types of criminal behaviour.

Each measure has its effects on various criteria such as safety, costs, deterioration, attractiveness of shopping centres, demands on police capacity, etc. The question is: how can we select the optimal measure(s) when all these effects are taken into account.

Specifying measures
All measures considered are specified. All important aspects of the measures have to be incorporated: scope, intensity, duration and relation with other current policy measures and relevant context variables. This is necessary for an exact as possible estimation of the effects of each measure.

Evaluation criteria
The list of relevant evaluation criteria is specified. In the evaluation instrument an extensive list of criteria is presented to the user who can select the ones he thinks are relevant in the particular situation. The user also can add new criteria.

Weighing criteria
Based on the importance the user attaches to each criterion, he specifies weighing coefficients for each criterion. These coefficients determine the relative impact of the various effects of each measure on their total valuation.

Matrix of effects
In the next step the user(s) estimates the effects of each of the measures on each of the criteria. A lot of these effects can only be estimated approximately, due to uncertainty and the qualitative nature of some of the criteria, for example 'deterioration of the neighbourhood'. Because of this for each criteria the same rough semantic scale is used for effects:
No or negligible effect – very small – small – considerable – large – very large – extreme.
It is important to realise that only relative *differences* between measures in effects are decisive in the evaluation.

Valuation of effects
The effects, expressed as semantic terms, are then expressed as scores on a simple quantitative valuation scale (0-100); the larger the effect, the higher the valuation score. Negative effects, for example costs, receive a negative score; positive effects, for example an increase in safety receive a positive valuation score.

Weighing of effects
Effects on different criteria are differently valuated, according to the weighing coefficients of the criteria. This is done by multiplying the valuation scores on a criterion by its weighing coefficient.

Total valuation score
Finally all weighed valuation scores of each measure simply are added. The valuation sum of a measure will increase if it causes more positive effects on highly valuated criteria; it will decrease if it causes more negative effects on highly valuated criteria. The comparison of the balances of valuation scores of the measures is decisive in the evaluation.

Remarks
How the instrument is applied depends on the goal of the user. He could use it to make a quick scan or on the contrary a sophisticated evaluation. He could estimate the effects by himself or he could set up an expert meeting to do this.

When the data input is generated collectively by a team of experts with different backgrounds, (for example: police, local government, expert on security, employers organisation), experts may differ in weighing coefficients and in estimated effects. The latter can be agreed upon

after discussion; the weighing coefficients however, depend on the perspective and the interests of the participant. Applying the instrument has the advantage that both aspects – perspective and estimated effects – are untangled, making the discussion much more transparent.

Varying the weighing coefficients, the user can gain insight into the effects of these on the valuation scores. Doing so, he also can explore the probable preferences of other parties involved by estimating their weighing coefficients.

Users might estimate the effects of measures in the context of different scenarios: how sensitive is the outcome of the evaluation for future developments, for example in police capacity or an increase in crime.

Applying the instrument on a broad scale offers an interesting opportunity: the process of defining criteria, weighing coefficients and estimated effects becomes standardized, and data and outcomes of evaluations become comparable between situations. By making these accessible for policy makers, experience with safety measures will quickly accumulate.