

Legislative Council Panel on Constitutional Affairs

**Launching a pilot scheme of electronic counting in the
2020 Legislative Council General Election**

PURPOSE

This paper reports the results of the electronic counting machines testings conducted by the Registration and Electoral Office (“REO”), and seeks Members’ views on launching a pilot scheme of electronic counting in some traditional functional constituencies (“FCs”) in the 2020 Legislative Council (“LegCo”) General Election.

BACKGROUND

2. In its Report on the 2016 LegCo General Election, the Electoral Affairs Commission (“EAC”) recommended that “the REO should continue to carry out comprehensive and in-depth feasibility studies to assess the use of information technology in different aspects of the election process with a view to making better voting arrangement, also ensuring the technology adopted can provide an independent and visible audit function”. To follow up on the EAC’s recommendation, the Government undertook at the meeting of this Panel in July 2017 to conduct studies on the feasibility of introducing electronic counting of votes in future LegCo elections, taking into account factors such as the technical aspects and work flow, etc.

3. As we mentioned in the discussion paper in June 2017 on the design of ballot papers for LegCo elections, the size of a ballot paper has a direct bearing on the feasibility of implementing electronic counting of votes. For instance, in the 2016 LegCo General Election, the number of candidate lists was as many as 22 in one geographical constituency (“GC”), and the size of ballot papers for the said GC reached 440 mm (in width) x 428 mm (in length). Given that the number of GCs (i.e., five) and the upper and lower limit for returning members in each GC (i.e., five to nine) will remain unchanged in the 2020 LegCo General Election, on the premise that the design of the ballot papers remains the same, there is currently no counting machine available in the market that is capable of handling ballot papers of the relevant size. At the same time, the polling-cum-counting arrangement adopted in GCs means that counting procedures will be dispersed across over 600 stations, and it will not be

operationally feasible to employ counting machines in a centralised manner. As such, we consider that it will not be suitable to implement electronic counting in GC elections.

4. Regarding the District Council (“DC”) (second) FC, we note that the number of candidate lists is generally smaller than that for GC elections, hence the ballot papers are smaller in size. At the same time, the number of ballot papers in the DC(second)FC is relatively large. We had therefore selected that FC as a starting point for conducting the feasibility study.

TESTING RESULTS

5. The REO has identified six counting machines through market research and conducted detailed testing of the machines. During the process, the REO had sought advice from the Office of the Government Chief Information Officer on issues relating to the technical aspects of the machines. Of the six counting machines being tested, we found that two of them are not suitable for conducting electronic counting owing to their performance and design.¹ For the four remaining machines, they can broadly be classified into two categories, namely those with paper counting function only, and those with both vote recognition and paper counting functions.

6. Overall speaking, machines with paper counting function only delivered satisfactory performance both in terms of accuracy and speed. This type of machines achieved an accuracy of 100% in counting the number of ballot papers, and their counting speed ranged from 150 to 170 sheets per minute. This may be due to the fact that the designs of the softwares and machines are both relatively simple. On the other hand, while machines with both vote recognition and paper counting functions could attain a recognition accuracy of 99.8% at the highest, they could not meet the recognition accuracy for counting machines used in Election Committee subsector (“ECSS”) elections (i.e., 99.99%). The average speed of this type of counting machines is also relatively slow. This is due to the fact that counting machines currently available in the market are not designed for validating choices marked in the form of “✓” chop on the ballot papers as required by the law. REO also observed that jamming would occur in both types of counting machines when it came to the handling of folded ballot papers, and the problem was more apparent in machines with both vote recognition and paper counting

¹ One of the machines destroyed some ballot papers during testing while another machine could not sense folded ballot papers effectively.

functions.² The testing results of the four counting machines are set out at **Annex A**.

7. As regards the workflow, under the existing arrangements of manual counting, counting officers are required to sort the ballot papers according to the choice marked on each ballot paper before counting the votes of each candidate list. The major steps for counting of votes are at **Annex B**. If machines with both vote recognition and paper counting functions are adopted, it will help automate the aforesaid step, thereby streamlining the counting procedure. For machines with paper counting function only, counting officers are still required to sort the ballot papers according to the choice of candidate list marked on each ballot paper.

ASSESSMENT

8. Based on the results of REO's feasibility study, we note that while machines with paper counting function only could achieve steadier performance, this type of counting machines does not have the function of vote recognition, and counting officers are still required to sort the ballot papers according to the choice marked on each ballot paper before using the machines for vote counting, which does not help streamline the counting process. We therefore do not recommend introducing this type of machines in LegCo elections.

9. As for counting machines with both vote recognition and paper counting functions, they are yet to attain the recognition accuracy of 99.99% as required. Owing to the large volume of ballot papers in the DC(second)FC, this FC has all along been the last FC to complete the counting process. In the event that some people cast doubts on the accuracy of the counting machines and request for re-count, the overall counting time would be significantly lengthened, which would in turn delay the completion time of the entire general election. More importantly, members of the public may lose confidence in electronic counting. Hence, we have reservation in adopting this type of counting machines for counting over two million votes of the DC(second)FC in the 2020 LegCo General Election.

10. The REO had processed traditional FC ballot papers using the two counting machines with both vote recognition and paper counting functions. Since the traditional FC ballot papers are relatively smaller in size and are not required to be folded, the testing results were rather

² In accordance with Section 54(3) of the Electoral Affairs Commission (Electoral Procedure) (Legislative Council) Regulation (Cap. 541D), an elector voting for the DC(second)FC must fold the ballot paper so that the marked side is inside, and put the folded ballot paper into the ballot box.

satisfactory. One of the counting machines even achieved a recognition accuracy of 99.99%, and the jamming rate was significantly lower when compared to the handling of DC(second)FC ballot papers. As such, we consider that it more feasible to launch a pilot scheme of electronic counting in some traditional FCs, and to use machines with both vote recognition and paper counting functions for counting the number of votes in the said FCs in the 2020 LegCo General Election.

RECOMMENDATIONS

11. In light of the aforementioned assessment, and after obtaining the EAC's agreement in principle, we **propose** that a pilot scheme should be launched to implement electronic counting using machines with both vote recognition and paper counting functions in three traditional FCs in the 2020 LegCo General Election to gain experience, with a view to further studying the feasibility of implementing of electronic counting in the DC(second)FC in future LegCo elections. This proposal has also taken into account the following factors –

- (a) electors are not required to fold the ballot papers of traditional FCs before putting them into the ballot boxes, hence lowering the jamming rate and enhancing the accuracy of vote recognition of the counting machines. We believe that the pilot scheme could help build confidence in electronic counting among members of the public;
- (b) ballot papers of traditional FCs are typically smaller in size than those of the DC(second)FC³, which should be more manageable for electronic counting machines; and
- (c) given that the number of electors for traditional FCs is relatively smaller, there should be sufficient time for counting staff to conduct manual counting for comparing and validating the counting results in the event candidates or their agents request a re-count of votes and such a request is accepted⁴.

³ In 2016 LegCo General Election, the size of ballot papers for DC(second)FC was 220 mm (in width) x 292 mm (in length), while the size of ballot papers for traditional FCs was 146 mm (in width) x 258 mm (in length).

⁴ We propose that under the pilot scheme, if the request for re-count is accepted by the Returning Officer, the re-count shall be conducted with the use of manual counting. If electronic counting is implemented in a full scale in future LegCo elections, we propose that the re-count shall be once again conducted with the use of electronic counting machines unless the candidates or their agents request for re-counting the votes in the way different from the first count with convincing reasons. This is consistent with the existing practice in the ECSS elections.

12. We further **propose** to adopt the following criteria for the selection of traditional FCs for the pilot scheme –

- (a) if counting machines are adopted for handling ballot papers for the DC(second)FC in the future, we estimate that each counting machine can handle ballot papers from two ordinary polling stations, ranging from 10,000 to 20,000 ballot papers. In this regard, we should choose traditional FCs with voter turnout close to the above range for the proposed pilot scheme in the 2020 LegCo General Election in order to gain experience;
- (b) the four special FCs, i.e., Heung Yee Kuk FC, Agriculture and Fisheries FC, Insurance FC and Transport FC, are considered not suitable as the voting system for these special FCs is different from that of the DC(second)FC. Electors or authorised representatives of the said FCs are required to mark their preference by entering Arabic numerals against the names of candidates on the ballot paper. Besides, the registered number of electors in these FCs are relatively smaller (i.e. under 300); and
- (c) the Labour FC is considered not suitable as the voting system for this FC is different from that of the DC(second)FC. Electors may mark their choices by marking a “✓” against the names of up to three candidates.

ADVICE SOUGHT

13. Members are invited to express views on the above proposal. The Government will consider Members’ views before introducing the required legislative amendments into the LegCo within this year.

Constitutional and Mainland Affairs Bureau
Registration and Electoral Office
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Annex A

Testing results of four counting machines conducted by the Registration and Electoral Office (District Council (second) Functional Constituency)

	Average Speed (per minute)	Jamming Rate	Accuracy (in terms of number of sheets)
<i>With paper counting function only</i>			
Sekonic SR-11000	170 sheets	0.021%	100%
中科信息技術有限公司 JPT 智能計票一體機 A	150 sheets	0.001%	100%
<i>With both vote recognition and paper counting functions</i>			
Sekonic SR-6500 Hybrid	50 sheets	0.02%	99.8%
中科信息技術有限公司 JPT 智能計票一體機 B	110 sheets	0.04%	99.8%

Major Steps for Counting of Votes

Step 1	Sifting out misplaced geographical constituencies or other functional constituencies ballot papers found in ballot boxes
Step 2	Sorting the ballot papers according to the choice marked on each ballot paper
Step 3	Counting the number of votes for each candidate list
Step 4	Determination of questionable ballot papers, if any
Step 5	Calculation and consolidation of counting results from individual counting tables
Step 6	Declaration of election results

Remarks

1. Steps 2 and 3 can be automated if counting machines with both vote recognition and paper counting functions are used.
2. Step 3 can be automated if counting machines with paper counting function only are used.