DEVELOPING VOTERS' DECISION MODELS FOR AN INFORMATION SYSTEM: AN EMPIRICAL STUDY OF THE FIRST DIRECT PRESIDENTIAL ELECTION IN TAIPEI, TAIWAN

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ABSTRACT

This research developed two voters' decision models that were based on the theories of '7535 Voters Structure' and 'Image Voting' for an information system. It was used to collect data and to predict voters' decision during the first direct Presidential Election in Taipei, Taiwan, 1996.
There are two main contributions of this research as follows:

1. Modeling aspect: Discovering that voters' choices were decided by two factors: 'structural decision' and 'image decision'. If the two decisions are not the same, the 'structural decision' will be prior to the 'image decision'.
2. Data gathering aspect: Inventing 'random last digits sampling' and 'all households interviewing' methods. The data precision of these new methods is better than traditional methods: 'telephone directory systematic sampling' and 'first adult interviewing'.

This study also might provide some reference perspective of cross-cultural understanding.

Keywords: voters' decision, model building, information system, image, voters structure

BACKGROUND

This study was a part of the researcher's longitudinal research series: 'Voters' Behavior in Taiwan' from 1980. This series attempted to develop a specific information system with decision support functions for observing political campaign. Since the models-data-dialog has become a popular paradigm to categorize the components in a Decision Support System (DSS)[1][9][14], this study was focus on discussing the former two components. The first critical step would be developing the model-building blocks[15] to analyze, explain, and predict voters' choices. After 16 year trial and error, the researcher had developed two models as: '7535 Voters Structure' theory and 'Image Voting' theory. These theories had been tested by many different elections and produced reliable and valid predictions.

During the Presidential Election 1996, this study had conducted in Taipei Metropolitan. This election was the first time that people chose their President directly after the amendment of constitution. After many congressional, provincial, and local election experiences, the ever largest election in Taiwan was fair and successful in lights of voting procedures. It was also hot and passionate in lights of campaigns and interactions of candidates and their voters. It granted a best opportunity to observe the transformation of an important developing country by her voters in the history.
There were 4 candidates in this election:
Lee Deng-Huei: nominated by the ruling party Kuo Ming Tang (KMT)
Peng Ming-Ming: nominated by Democratic Progress Party (DPP)
Lin Iang-Gang: nominated by New Party (NP)
Cheng Lu-An: an independent candidate

SPECIFIC OBJECTIVES

There were 2 aspects differed from former studies of the series:
1. Modeling aspect:
The researcher found that the 'structural/ ideological decision'(7535 Voters Structure) and 'candidate's image decision' (Image voting) would affect voters' choices.
According the former studies, the 2 decisions would be coherent if the number of candidates were or under 3. The image voting decision was formulated as a key equation in the model base to predict voters' choice. The errors of all the former elections were under or around 2%. [19]
There were 4 candidates in this election. The first question would be: Was there any inter correlation between the 2 decisions? How would they influence voters' behavior?

2. Data gathering aspect:
This information system's data component included 3 sub systems: sampling, questionnaires editing and group interviewing system. Considering former studies, the researcher initiated several data gathering methods for further testing to build up a better database and to minimize errors. These methods also develop some new enhanced modules as follows:
A. Sampling system:
a. Random last digit dialing module: compare with systematic sampling method.
b. Sample weighting module: test if it fit the goodness of samples' area allocation: compare with no weighting.
B. Interviewing system:
a. All households interviewing module: compare with first adult interviewing method.
b. Non-replacement method: compare with strata

replacement method.

LITERATURE REVIEW AND PROBLEMS

Theories Development and New Theories Building

There was an early tradition on voting research based on behavioral sciences in the United States. There were a few exploratory studies during 1920 to 1940[13]. After 1940, there came some influential and distinguished theories with comprehensive context. The dominant factor to decide voters‘ choices that explained by these paradigms were the followings:
‘Social voting’ theory that was founded during 1940's by Lazarsfeld et al.[7]. ‘Party voting’ theory that was developed during 1950 to 1970 by Campbell et al. [2][3].‘Issue voting' theory that was initiated in 1970's by Nie et al. [9]‘Candidate voting’ theory by Kelley[6] and ‘Media voting’ theories by Patterson[12], Paletz [11] were suggested after 1980.
Because of the political environment changing, the democracy was growing after 1980 in Taiwan. Therefore, it encouraged researchers of different institutes to participate in systematic studies on voting behavior [17] [21].
The researcher and his colleague also began their series studies at this moment. After 10 times national wide elections, they developed ‘7535 Voters Structure’ theory and ‘Image Voting’ theory[17][19][20].

7535 Voters Structure

The contexts of this theory were the followings:

Who, vote for whom?

The researcher reviewed the voters' database by computer simulation and deduced that there was a stable voting model of '7535 structure'.
Say, if there were 20 voters, they would:
7 persons, as 35%, would not vote unless there was a crisis to threaten their life or properties. They could be categorized as ‘alienator type’. If they voted, they voted for who seemed to be able to sustain their safety.
5 persons, as 25%, would vote for the candidate who owned the better resources, and usually who was nominated by the ruling party. These voters could be labeled as ‘agree type’.
3 persons, as 15%, would voter for the candidate who was against or criticized the current situation, and usually who was nominated by the major opposite group. These voters could be named as ‘disagree type’.
5 persons, as 25%, would not voter for certain ideology nor specific party. These voters could be recognized as ‘mobile type’. They would vote for whom ‘looked like’ all right.
‘7535’ is a conceptual proportion that is not a fixed number.

Why did they vote for?

Examining historical aggregated database and completing many empirical studies, the researcher summarized the voters structure as Table 1:

Image Voting

Lately, scholars pointed out a tendency that voters intended to vote for the candidate instead of the party. It indicated that the more pluralistic the society was, the less influential the party would be. In US, many researchers notified that candidates paid almost all attention to run media campaign, even only TV campaign. They were selling an individual instead of promoting any issue, value or group will.
In Taiwan, Hu et al. [5], Lei et al. [8] also found the growing behavior of ‘Candidate voting’. Cheng et al.[4] found that the higher popularity the candidate had, the higher

Table 1. Voters structure and their behavior

Voters type	Alienator	Agree	Disagree	Mobile
% of population	35%	25%	15%	25%
% of who voted	0%	38.5%	23%	38.5%
Factor of choice	Crisis	Candidate‘s ideology of maintaining current system	Candidate‘s ideology of changing current system	Candidate‘s image
Vote for	None, Unless there was a personal threat	Ruling party, Likely for KMT	Major opposite party, Likely for DPP	Uncertain, Likely for NP or who advocates new idea
Candidate‘s strategies to win votes	Appeals on personal safety	Ideology of stability Popularity Party‘s organizational campaign Incentives Public relations	Ideology of protesting Popularity Party‘s organizational campaign Incentives Public relations	Images such as education, professional experiences, ethic, integrity, and look. Popularity
Probability to be affected by candidate	low	very low	very low	high

possibility he/she might win. Evidences showed the similar conclusion of the researcher‘s studies.
However, the researcher wanted to emphasize a significant conceptual difference from the ‘Candidate voting’ theory.
The researcher found that voters did not vote for whom the candidate ‘is’, they voted for whom the candidate ‘looks like’.
According to the researcher‘s empirical database, few voters had talked to the candidates, even seen the candidates personally. In the one hand, voters ’did not know‘ the candidates actually; In the other hand, they still chose a candidate, even more, they thought they could evaluate candidates’ advantages and disadvantages. A closer explanation should be that voters were evaluating the communication manufacturing‘s out put of candidates. The manufacturing processes might be through interpersonal channels or media channels or both. Voters would vote for some images, even some mirages.
Thus, the researcher suggested that this behavioral model to be defined as ‘Image voting’.

Image Evaluation Indicator (IEI)

The simplest model of ‘Image voting’ is the following:
Image → Voting
The conceptual construct of candidate‘s ‘Image’ includes 2 operational definitions as follows:
Popularity: The level that the voter will think about the candidate without any hint.
Image evaluation: The scoring that the voters evaluate the candidate of his total impression.
Therefore, we could formulate an equation of ‘Image Evaluation Indicator’ (IEI):
IEI = Popularity * Image Evaluation
During the campaign period, each candidate can obtain an ‘Image Evaluation Indicator’ that can predict his probability to be elected.
The precision of prediction can be calculated by the correlation of the indicators and candidates‘ final votes after election.

Image voting indicator(IVI): a further modification

The researcher had begun to use ‘Image Evaluation Indicator’ since 1983. The precision of these indicators varied from .97 to .73. Though it was very complicated and difficult to reach such precision because sometimes there were more than 40 candidates running for single digit seats in a large constituency, the researcher would keep on more investigation to reduce the errors.
A further consideration was that voters might appreciate more than 1 candidate, but they could cast only one vote at last. Only was the candidate who was evaluated as the best had the chance to win the vote while the other candidates‘ ’Image value‘ would be in vain.
In the Taipei City Mayor Election 1994, the researcher modified an equation of ‘Image voting indicator’ (IVI) as follows:

If the interviewee knows the candidate Ci then Ci’s Popularity = 1
If the interviewee does not know the candidate Ci then Ci’s Popularity = 0
Only the highest evaluation will be counted as valid evaluation.
Highest evaluation must higher than or equal to a bottom line that the voter will support the candidate.
It is possible that more than one candidate has a same highest evaluation from a same voter.
If Ci’s Popularity =1 and
If the candidate Ci wins the highest evaluation form the voter and
If the evaluation passes the supporting bottom line
Then the Ci’s Supporting Voter = 1
IVI = Sum of Ci’s Supporting Voter /
Sum of All Candidates‘ Supporting Voter
This equation created above 98% precision to predict every candidate‘s votes in the election.
The most valuable contribution of former studies was providing theories of a behavioral framework on why and how voters made their decision.
The researchers were going to test if the theories reliably and validly existing in the largest election ever had in Taiwan.

METHODS

Sampling

Population: Registered voters in Taipei Metropolitan
Sample size and sample allocation:
Total size: 3000+ weighting size (determined by mid-term weighting schedule)
Total size was equally divided into 2 groups: Telephone directory systematic sampling (TDSS) group and Random last digit dialing (RLDD) group.

Measurement

A cultural specification was considered on the implementation of measurement. Five step scale is widely adopted in many countries. However, people in Taiwan are educated to use 100 point scale to measure all abstract quality from primary school. Taiwanese keep a relatively solid framework about the meaning of 100 point scale in mind. Its psychological distance is clearer than 5 step scale.
Thus, this study utilized 100 point scales to evaluate candidates‘ image. The general cultural perceptions of different point are:
Highest: 100; Lowest: 0;
Excellent: 90; Very good: 80; Ordinary: 70;
Pass (bottom line): 60; Very bad: under 50.

Interviewing Procedures

TDSS group used:
a. First adult interviewing method.
b. Strata replacement method.
RLDD group used:
a. All households interviewing method
b. Non-replacement method

Definitions of Methods

TDSS: Random selection from household phone directory database. TDSS group stood for the traditional methods.
RLDD: Randomly alter the last digit of the phone number that was selected by TDSS. RLDD group executed the new methods of this study.
First adult interviewing method: Interview the first adult who answers the phone, if he/she is a registered voter.
All households interviewing method: Interview all registered voters in the family whose phone number was selected.
Strata replacement method: Prepare strata of samples for replacing samples that are difficult to be located, in advance.
Non-replacement method: Do not give up to call the selected samples till the deadline.
Mid-term weighting schedule: Conduct a goodness fit test of samples‘ area allocation at the mid-term of the study period to see if it is necessary to weight sample size.

FINDINGS

This study compared the IVIs with the real percentages of votes that candidates won. The result of TDSS group was as Table 2:

Table 2. IVI and real percentage of TDSS

Candidate	IVI	Real percentage	Error
Li	30.49	38.90	-8.41
Peng	23.00	24.34	-1.34
Lin	21.81	24.87	-3.06
Cheng	24.70	11.89	12.81

χ^2 =16.06998; **P=0.001097

The result of RLDD group was as Table 3:

Table 3. IVI and real percentage of RLDD

Candidate	IVI	Real percentage	Error
Li	36.29	38.90	-2.61
Peng	19.34	24.34	-5
Lin	24.37	24.87	-0.05
Cheng	20.00	11.89	8.11

χ^2 =6.743997; P=0.080521

Table 2 obtained significant differences between IVI and real percentage (P<.01), while Table 3 produced no differences.
The researcher compared the real votes with the ‘7535 voters structure’ model and broke down the real votes into different voters’ type. The result would be Table 4:

Table 4.7535 voters structure breakdown

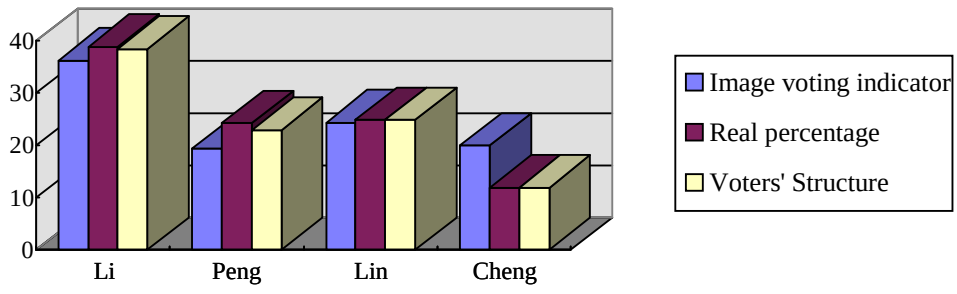
Candidate	Breakdown by voters‘ structure			Real %	Error
	Agree	Disagree	Mobile		
Li	38.50		0.40	38. 90	-0.40
Peng		23.0	1.34	24.34	-1.34
Lin			24.87	24.87	0
Cheng			11.89	11.89	0
Total	38.50	23.0	38.50	100	

CONCLUSIONS AND SUGGESTIONS

Voters with Certain Ideology Might Vote for Candidate’s Ideology while Voters without Certain Ideology Might Vote for Candidate’s Image

Comparing the real votes with ‘IVI’ (RLDD group) and ‘7535 Voters Structure', we would deduce some interpretations' base on Figure 1.

Figure 1. IVI, real votes and Voters Structure



Lin's error between IVI and real votes was -0.05% that could be concluded as very precise. Li’s difference was -2.61 that was also acceptably correct.
Peng‘s error was -5% and Cheng’s error was 8.11 that were lager differences.
With a further examination, the difference between Li‘s real votes and voters who was agree type with ideology reduced to -0.4%.
According to the same observation, the difference between Peng‘s real votes and voters who was disagree type with ideology was also

narrowed down to -1.34%.
It implied that Li and Peng kept all voters who had ideologies, no matter how their personal images were perceived by voters.
It also explained that voters with ideologies (whether agree or disagree type) had a 'structural voting' decision process. They voted for a stable direction. In the same time, voters of mobile type had a simple 'image voting' choice. They voted for candidate's personal image and attractions.
There was not a third influential party until the New Party participated the Legislative Yuan Election at the end of 1995. There were few very important independent candidates in national wide elections, too. It was a two party's competition in the past elections (actually, it was a one party game in a very long period).
Because of lacking of alternatives, the two choices of 'structural voting' and 'image voting' were coherent as one decision. Thus, the IVI itself was good enough to predict voters' behaviors in the researcher's past studies.
During this election, the 'structural voting' and 'image voting' were not always the same anymore. Some voters with certain ideology would score a candidate who had extraordinary personal image better evaluation than the candidate who stood for the ideology that voters belonged. However, they would go back to the ideology when they cast the votes.
Some candidates without certain ideology might gain appreciation from voters who had ideology before the final day. They would be gone in lacking of structural relationship at last. Only the real mobile votes remained.

Voters' decision process could be interpreted as follows, in this election.
The independent Cheng played a very extraordinary role in this election. He ran an ethical and religious campaign. He accepted very small financial support only and rejected all traditional campaign strategies and tactics. His move was 'walk and pray' instead. Cheng diagnosed that the main problem of the nation was the abuse of 'power and money' and he was going to correct it. He built up a 'pure stream' image successfully.
Lin and New Party also emphasized 'pure and new' image. The claimed that the current politics was a greedy sharing by the 2 major parties. Most members of New Party had very brilliant personal profiles such as high education and respectable profession. NP was a sort of elite's organization.
For the voters with ideology, there were 2.6% of agree type and 5% of disagree type betrayed Li and Peng during the campaign. They stated that they would prefer Cheng's appeal and image. However, preference and attitude were other than commitment and behavior. They were 'returning' to Li and Peng's ideological tent at decision day.
As solid as ideological voters, the mobile type voters had chosen simple candidates' personal image. About two thirds was for New Party's Lin while 1 third for Cheng. Li and Peng also gained around 1%.
Though Cheng attracted almost 8% ideological voters' attention for a while, they could not resist the gravity from the structural system.
According the above discussion, the voters' behavior could be modified as the following joint models (see Table 5):

Table 5. Modified joint models

Voters structure	Voting decision factor
Agree type	Agree ideology
Disagree type	Disagree ideology
Mobile type	IVI

Data Qualities of this Study Were Better than Traditional Methods

Checking Table 2 and Table 3, evidence revealed that the RLDD group's prediction was better than TDSS group's. To maintain a survey and decision support system's database with new methods of this study was better than traditional methods.
Further detailed analysis would suggest:
A. Sampling system:
a. Random last digit dialing would be better than systematic sampling.
b. Because the mid-term goodness fit test of samples' area allocation showed no significant bias, the weighting method was not implemented.
B. Interviewing system:
a. All households interviewing would be better than first adult interviewing.
b. Non-replacement would be better than strata replacement.

Cross-cultural Perspectives

In some countries, such as the United States, pollsters directly ask the voters' choice. The direct method produced enormous errors in Taiwan because of 2 problems. First, respondents are not always telling the truth because the through democracy history is not very long yet. Certain proportions of people still keep various considerations. Second, more than half voters do not decide a specific candidate before they cast their votes, though they have their evaluation framework in their mind already.[16] This psychometric method will explore voters' insights and provide a better approach to predict voters' decision.
Voters' choices always brought strong and long term impacts on political, economic, and social systems for their nation. This study also may provide a reference perspective to understand voters' behavior for the countries who are or will be experiencing new democracy.

Future Studies

This study was conducted in metropolitan area that had more

pluralistic characteristics to form mobile votes. The voters‘ behavioral pattern might differ from Taipei. It needs further research to investigate the theories.

The recursive way to break down the real votes into ‘7535 structure’ was not a strong enough evidence yet. The researcher suggested a two-step method for the future study:

First, using attitude scales to identify voters‘ type.

Second, using IVI to measure voters’ decision.

If the modified theory was correct, it would predict voters' decision base on solid empirical data.

More dimensions of information systems’ applications on human’s behavior such as voting and political participation were also recommended and expected.

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