The Impact of Text Information Readability of Listed Companies' Annual Reports on Investors' Perception and Decision-making Behavior

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***Abstract*—Readability is one of the most important characteristics of text information in the listed company's annual report. There exists a "framing effect" when decision makers use information, which means individual decisions are influenced not only by the content, but also by the way in which information is expressed. Readability greatly affects investors' trust perception and emotional experience, then, affects their decision-making. Based on the heuristic model of emotion and dual processing theory, this paper established a theoretical model to analyze the impact of readability on investors' trust perception, emotional experience and investment intention under different financial conditions. By using behavioral methods, we designed a 2 (readability: high, low) *2 (financial status: good, spread) mixed cross experiment to collect data. Our study reveals that regardless of profit status, investors are more willing to invest in companies with more readable annual reports and that the influencing process is mediated by investors' emotional experience and trust perception. These findings provided evidence for how the information disclosed by enterprises affects investors' perception and decision-making behaviors and also established theoretical basis for improving corporate information disclosure strategies.**

Keywords-annual report; readability; trust perception; emotional experience; investment intention.

I. INTRODUCTION

In the era of big data, information has increased explosively. Regulators and scholars increasingly emphasize the treatability of information. As early as 1998, the U.S. Securities and Exchange Commission (SEC) published the Plain English Handbook to improve the readability of the documents disclosed by enterprises. The China Securities Regulatory Commission (CSRC) has also emphasized that annual reports of listed companies can be illustrated with statistical charts and pictures so as to improve the readability. This study focused on the impact of readability on investors' trust perception, emotional experience and investment intention and we further analyzed the mediating effects of emotional experience and trust perception on investment intention.

As an important channel for listed companies to disclose information, an annual report contains financial information and non-financial information. Financial information is disclosed through standardized financial statements and will be audited by certified public accountants. Non-financial information is mainly disclosed through narrative text information, which provides useful incremental information for stake-holders [1]. Because narrative text information does not need to be audited, it may be easier for managers to manipulate to achieve impression management [2]. For example, managers may manipulate the readability of annual reports to obfuscate a company's performance [3].

Previous studies have shown that there are differences in the readability of management's information disclosure and this difference in readability is positively correlated with the market's short-term response [4]-[7]. Annual reports with low readability often lead to lower overall trading volumes and lower trading consensus [6], and investors are more likely to invest in companies with more readable disclosure documents [4]. On the contrary, annual reports with high readability are positively correlated with the trading volume of general investors, extraordinary returns and the possibility of corporate equity refinancing [5].

These results provide strong evidence for our study that the readability of disclosure documents can affect investment decisions and market results. However, previous studies only focused on the economic consequences of readability. They did not explore the causes of these results. Why did readability affect investors' behavior? The mechanism of the impact of readability on investors' decision-making remains to be further explored. Therefore, we introduced emotion and trust in psychology, trying to uncover the "black box" behind this

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problem through the heuristic model of emotion and dual processing theory. This study not only provided new evidence for how information disclosed by enterprises affects investors' perception and decision-making behaviors, but also established a theoretical basis for improving corporate information disclosure strategies.

The rest of paper is organized as follows. Section 2 summarizes the literature review and develops our hypotheses. Section 3 describes the methods. Section 4 reveals the results and the analysis. Section 5 includes conclusions and suggestions.

II. Literature Review and Hypotheses

Four hypotheses were proposed based on the literature on readability of annual reports, investment intention, emotion and trust.

A. Readability and Investment Intention

Readability is the cornerstone of text communication. It is the key factor which determines whether a text can be effectively understood [8]. According to Ease of Processing theory, people seem to prefer information which can be processed more easily [9]. Therefore, the more readable the information is, the smoother the process will be for investors, which also implies that such information disclosure is more reliable. Previous studies have proved that text readability can significantly influence the judgment of small investors [10][11]. Low readability tends to reduce investors' trust in information sources, leading to participants' poor evaluation [12]. Investors are more likely to invest in companies with more readable annual reports [5]. At the same time, readability often reflects executives' psychological characteristics and behavioral motivation to the capital market [13], and then affects the response of capital markets. Therefore, we believe that higher readability conveys more positive signals to investors and enhances their confidence and cooperation intention, thereby improving their investment intention. Thus, we propose the following hypothesis:

H1: Investors prefer to invest in companies with more readable annual reports.

B. Mediating Effects of Emotional Experience

In uncertain environment, individuals often use emotional heuristics to make choices. They consciously or unconsciously make decisions based on their subjective emotional reactions to task options [14]. Modern theories of cognitive psychology and neuroscience hold that there are two systems in human’s brain in the process of reasoning and decision-making, namely, the intuitive system and the rational system. The systems operate in parallel and depend on each other's guidance [15]. Both the heuristic model and the dual processing theory emphasize the role of emotional and intuitive irrational factors in decision-making. Analytical reasoning cannot be effective unless guided by emotion. Therefore, rational decision-making requires a proper combination of analytical system and intuitive system [15].

When investors make decisions, the company's business performance and future prospects provide important reference and will ultimately affect their investment intention and decision-making. This process is the result of careful analysis processed by the brain's rational systems. Rational analysis is important. But in uncertain and complex decision environment, people tend to rely on emotional experiences to make decisions [16]. A growing body of research has provided evidence that both positive and negative emotion can influence investor behaviors. Positive emotion will increase investors' risk tolerance [17]. In this case, investors will overestimate the return of investment decisions and underestimate the corresponding risks, thereby improving the level of investment [18]. However, negative emotion will increase the degree of investors' "loss avoidance" [17] and people will make careful analysis and critical evaluation when reasoning and making decision. Based on the above analysis, we predict that high readability will stimulate positive emotion and make investors enhance their investment intention and that low readability will generate negative emotion and make investors reduce their investment willingness. Therefore, we propose the following hypotheses:

H2: The impact of annual reports' different readability on investment intention is mediated by positive emotion triggered by investors. Annual reports with high readability will generate positive emotion and enhance the investment intention.

H3: The impact of annual reports' different readability on investment intention is mediated by negative emotion triggered by investors. Annual reports with low readability will generate negative emotion and reduce the investment intention.

C. Mediating Effects of Trust Perception

According to social psychology, trust is the process that the trustor generates confident and positive expected cognition based on words, behaviors and decisions of the trustee. In uncertain and uncontrollable circumstances, individuals tend to make judgments and decisions according to their trust perception. Trust Decision-making Model further explains the generation of trust that based on the trustor's perception of trustee's ability, integrity and kindness, the trustor will form a cognition of the trustee's credibility, and further form a trust evaluation for the trustee, thereby making the choice of whether to trust the trustee [19]. In the process of investment decision-making, an investor's first impression comes from the course of information collection and evaluation of listed companies. The investor will form a trust perception in listed companies and their management through reading or other intuitive feelings, and then make investment decisions. If the annual report's high readability increases the investors' trust perception in ability, integrity and kindness of the listed company and its management, and improves the investors' favorable impression for the company, we expect that investors will enhance their willingness to invest. On the contrary, the annual report's low readability may reduce investors' trust evaluation, thereby reducing their willingness to invest. Base on the analysis above, we propose the following hypothesis:

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H4: The impact of annual reports' different readability on investment intention is mediated by the trust perception of investors.

III. METHODS

In order to verify the above four hypotheses, the required data were collected through experimental methods, including the design of participants, task materials, and procedures.

A. Participants

Participants were 40 graduate students of Beijing University of Posts and Telecommunications, including 10 males and 30 females. The age of participants ranged from 20 to 25. All participants had financial foundation and stock investment experience. Finally, a total of 38 valid data (9 males and 29 females) were collected.

B. Task Materials

Task materials were four simplified annual reports of different companies. Based on real annual reports disclosed by Shanghai Stock Exchange, we prepared two simplified annual reports according to the company's financial position (makes a profit or loss). On this basis, we changed their readability by changing the length of sentences and paragraphs, as well as altering information's present format (highlight the title and the main data, for example). By doing so, we controlled the consistency of the information content contained in two annual reports. Finally, we got 2 (readability: high, low) *2 (financial status: good, spread) totally 4 different company' simplified annual reports. Among them, company A and B were the profit group, in which A's annual report had high readability while B had low readability; C and D were the loss group, in which C's annual report had high readability while D had low readability.

In addition, some seven-point Likert-type scales were designed for our experiment. These scales included a reading feedback scale, an emotional scale, a trust scale, an investment intention scale and a basic information questionnaire. In the reading feedback scale, 4 items were designed to test how carefully the participants read the task materials. For the emotional scale, we used the Positive Affect and Negative Affect Schedule designed by Watson et al. [20] to evaluate investors' emotional experience. In our trust scale, we developed 12 items to evaluate the participants' trust perception on ability, integrity and kindness of the listed company and its management. In the investment intention scale, we designed 3 items to evaluate the investment intention of investors.

C. Task Procedures

We simulated the real investment environment and divided the tasks into profit group (A&B) and loss group(C&D). Each participant was asked to participate in both groups randomly. The main steps are as follows: participants were asked to read the annual reports of the two companies corresponding to the first task group. After reading, they needed to fill in the reading feedback and investment intention scale (the order of the two companies were random). After the completion of the first task, participants could rest freely and then followed the same process to complete the second task. After finishing both tasks, participants filled in the emotional scale, the trust scale and the basic information questionnaire. The experiment ended.

IV. RESULTS AND ANALYSIS

Paired-Samples T Test and Bootstrap mediation test were performed on the experimental data to test the validity of the above four hypotheses.

A. Readability and Investment Intention

According to the results of Paired-Samples T Test, readability had significant influence on investors' investment intention. As Figure 1 shows, the average investment intention of the company with more readable annual report is significantly higher than that of the company with less readable annual report in both groups (profit group: t=5.598, p=0.000; loss group: t=3.391, p=0.002).

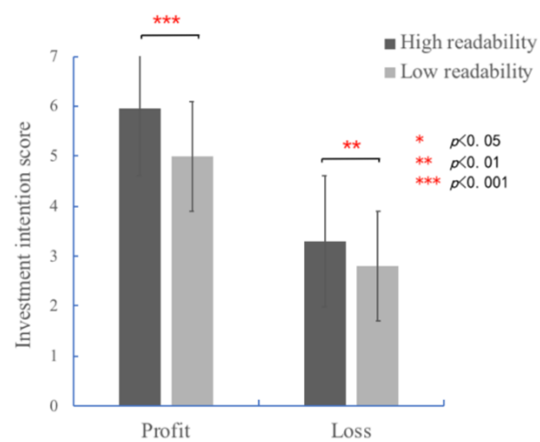

Figure 1. Investment intention under different surpluses

Therefore, H1 is supported. Regardless of profit status, investors prefer to invest in companies with more readable annual reports.

B. Mediating Effects of Emotional Experience

The results of Paired-Samples T Test showed that annual reports' readability causes significant differences in positive and negative emotion. Specifically, positive emotion triggered by high readability is significantly different from those triggered by low readability (profit group: t=7.712138, p=0.000; loss group: t=8.140316, p=0.000); negative emotion triggered by high readability is also significantly different from those triggered by low readability (profit group: t=4.091056, p=0.000; loss group: t=5.044795, p=0.000).

To further examine the mediating effects of emotional experience, we performed Bootstrap mediation test with reference to the mediation effect analysis procedure proposed by Zhao et al. [21] and multiple parallel mediation variable test methods proposed by Preacher and Hayes [22]. The sample size was selected as 5000 and the confidence interval was set as 95%. Table 1 shows the results.

TABLE I. MEDIATING EFFECTS OF EMOTIONAL EXPERIENCE

Status	Path	Effect	Boot SE	Boot LLCL	Boot ULCI
profit	direct effect	0.428	0.238	-0.047	0.903
	indirect effect	0.511	0.191	0.179	0.932
	positive emotion	0.462	0.245	0.014	0.956
	negative emotion	0.049	0.104	-0.143	0.277
loss	direct effect	-0.284	0.335	-0.953	0.385
	indirect effect	0.775	0.231	0.317	1.235
	positive emotion	0.474	0.216	-0.003	0.864
	negative emotion	0.301	0.153	0.052	0.660

Under the condition of profitability, because 0 was not contained in the interval (LLCI=0.179, ULCI=0.932), the two mediating variables, positive emotion and negative emotion, taken as a set, jointly mediated the relationship between readability and investment intention. The indirect effect through the two mediators was 0.511. An examination of the specific indirect effects indicated that only positive emotion was a mediator while negative emotion was not, since positive emotion's 95% CI did not contain 0 (LLCI=0.014, ULCI=0.956), and negative emotion's 95% CI contained 0 (LLCI=-0.143, ULCI=0.277).

The results indicated that, in profitable companies, the relationship between readability and investment intention was mediated by positive emotion, but not by negative emotion. Figure 2 shows the corresponding mediating model.

Figure 2. Emotional Experience mediating model of profitable company

Under the condition of financial loss, the interval (LLCI=0.317, ULCI=1.235) did not contain 0, indicating that the mediating effects of positive emotion and negative emotion were significant. The indirect effect through the two mediators was 0.775. In the two mediating paths, only negative emotion was a mediator, since its 95% CI did not contain zero (LLCI=0.052, ULCI=0.660). The mediating effect of positive emotion was not significant (LLCI=-0.003, ULCI=0.864).

The results indicated that, in loss-making companies, the relationship between readability and investment intention was mediated by negative emotion, but not by positive emotion. Figure 3 shows the corresponding mediating model.

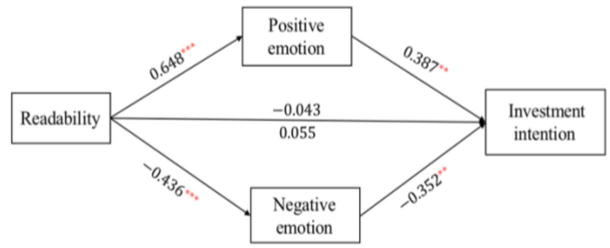

Figure 3. Emotional Experience mediating model of loss-making company

The interpretation of these results is that different emotions were at work under different surplus situations. In profitable companies, positive emotion mediated the effect of readability on investment intention. On the contrary, in loss-making companies, it was negative emotion but not positive emotion that mediated the effect of readability on investment intention.

C. *Mediating Effects of Trust Perception*

According to the results of Paired-Samples T Test, annual reports' readability caused significant differences in investors' trust perception (profit group: t=7.153509, p=0.000; loss group: t=5.821748, p=0.000). There were significant relations between trust perception and investment intention (profit group r=0.587, p=0.000; loss group r=0.415, p=0.001).

To further examine the mediating effect of trust perception, we conducted Bootstrap mediation effect test with reference to the mediation effect analysis procedure proposed by Zhao et al. [21] and Bootstrap method proposed by Preacher and Hayes [23] and Hayes [24]. The sample size was selected as 5000 and the confidence interval was set as 95%. Table 2 shows the results.

TABLE II. MEDIATING EFFECTS OF TRUST PERCEPTION

Status	Path	Effect	Boot SE	Boot LLCL	Boot ULCI
profit	direct effect	0.488	0.203	0.083	0.893
	indirect effect	0.450	0.137	0.218	0.756
loss	direct effect	0.048	0.283	-0.516	0.612
	indirect effect	0.443	0.158	0.171	0.790

Bootstrapping analysis indicated that 0 was not included in the indirect path regardless of profit status (profit group: LLCI=0.218, ULCI=0.756; loss group: LLCI=0.171, ULCI=0.790). These results revealed that trust perception mediated the relationship between readability and investment intention. H4 is supported. Figure 4 and Figure 5 show the corresponding mediating models.

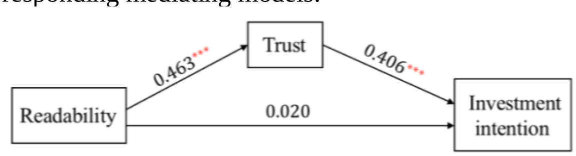

Figure 4. Trust mediating model of profitable company

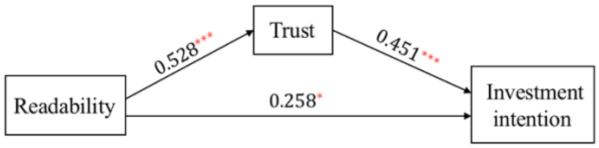

Figure 5. Trust mediating model of loss-making company

We used SPSS22 to analyze the above experimental data.

V. Conclusion

As one of the most important characteristics of text information in the listed company's annual report, readability considerably affected investors' decision-making. However, previous studies only focused on the economic consequences of readability. There were few empirical studies on the mechanism of readability' impact on investors. Based on the heuristic model of emotion and dual processing theory, this paper established a theoretical model to analyze the impact of readability on investors' trust perception, emotional experience and investment intention under different financial conditions. By using behavioral methods, we designed a 2 (readability: high, low) *2 (financial status: good, spread) mixed cross experiment to collect data. This study reveals that, regardless of profit status, investors are more willing to invest in companies with more readable annual reports and the influencing process is mediated by investors' emotional experience and trust perception.

This study provided new evidence for how information disclosed by enterprises affects investors' perception and decision-making behaviors. Firstly, we have provided evidence that investors prefer companies with more readable annual reports regardless of profit status. Secondly, we proved that the impact of readability on investment intention is mediated by emotional experience and trust perception. We interpret these results as that analytical system and intuitive system work together in the process of making judgments. When investors make decisions, the company's business performance and future prospects provide important reference and will ultimately affect their investment intention and decision-making. This is a process of careful analysis by the brain's rational systems. At the same time, the brain's intuitive system also plays a significant role that irrational factors, such as trust perception and emotional experience evoked by readability, affect investors' judgments and decisions as well. Our results are consistent with the notion that when investors make decisions, annual report information is processed by analytical system and intuitive system together and then affects investors' investment behavior.

This study also provided a theoretical basis for improving corporate information disclosure strategies. There exists a "framing effect" when decision makers use information, which means individual decisions are influenced not only by information content, but also by the way in which information is expressed. Readability affects investors' trust perception and emotional experience and then influences their decision-making behaviors. Therefore, in the process of information disclosure management, managers can make effective use of this influence by choosing more effective information disclosure methods (for example, disclose more readable documents) to send positive signals to investors and stakeholders, in order to improve the company's credibility and value identity and promote market and enterprise development more effective.

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