

# The Implicit Structure and Matching Model of Information Mental Accounting

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**Abstract:** ***Purpose/Significance:** With the rise of new media and the increase in the number of platforms, it is more difficult for individuals to achieve the desired optimal utility in information decision-making, and traditional rational person theory can not meet the needs of practical decision-making. **Methods/Process:** Differentiate and analyze the similarity and correspondence between information behavior and Consumer behaviour, introduce Mental accounting into the information field, propose the concept of information Mental accounting, and reveal the implicit structure and matching mode of it through literature research, questionnaires, Focus group and other methods. **Results/Conclusion:** The results show that individuals have an information mental accounting and it is non-substitutability, it is divided into two dimensions: demand (use) and source. A matching model with demand centered is as "time cost-information demand-information source" and a matching model with source centered based on the independent index of information sources are constructed. **Originality/Value:** The study reveals the inherent psychological laws of individual information decision-making in complex environment, providing a new theoretical perspective and framework for the field of information behavior.*

**Keywords:** Information mental accounting, Implicit structure, Matching mode, Independence index of information source.

## 1. Introduction

The rise of new media exemplified by social media, has led to an explosive growth in information platforms. Within these new platforms, information undergoes deep cross-integration, confronting individuals with greater uncertainty in selecting and utilizing information sources. This uncertainty aligns with Simon's (1989) [1] observation — no matter how adaptive an organism's behavior may be in study and choice situations, this adaptability falls far short of the ideal maximization state envisioned in economic theory. theories grounded in the concept of the rational actor are not entirely suitable for the selection and use of new media in today's complex environment. It is necessary to rethink how individuals choose and utilize information sources: What are the underlying psychological mechanisms of decision-making when individuals face the selection and use of massive information sources?

Kahneman (1984) [2] posited that choice-making fundamentally involves evaluating multiple outcomes, with the simplest and most basic method being to weigh gains against losses. Building upon Kahneman's prospect theory, Thaler (1980) [3] introduced the "mental accounting" theory, widely applied to explain irrational decision-making in consumer and financial investment contexts. As mental accounting theory evolves, its conceptual scope continues to expand, giving rise to concepts such as time-based mental accounting [4] and emotion-based mental accounting [5]. Individual information behavior similarities with consumption behavior, as both involve processes of "income" and "expenditure." When managing income and expenditures, individuals engage in psychological comparisons and evaluations. The mental accounting theory offers compelling explanations and predictions for numerous decision-making and consumption behaviors from a cognitive psychology perspective. Transplanting the mental accounting concept into the information domain, the information mental accounting construct is proposed. Information mental accounting refers to the cognitive process that individuals mentally categorize,

estimate, and budget information [6]. While previous studies have introduced the concept of information mental accounting, this paper delves into its implicit structure and characteristics. It aims to provide theoretical support for revealing the psychological cognitive mechanisms underlying information decisions in complex environments. Furthermore, it conducts preliminary exploration and analysis of user adoption behavior in new media environments from the perspective of information mental accounting, offering insights for future research.

## 2. Literature Review

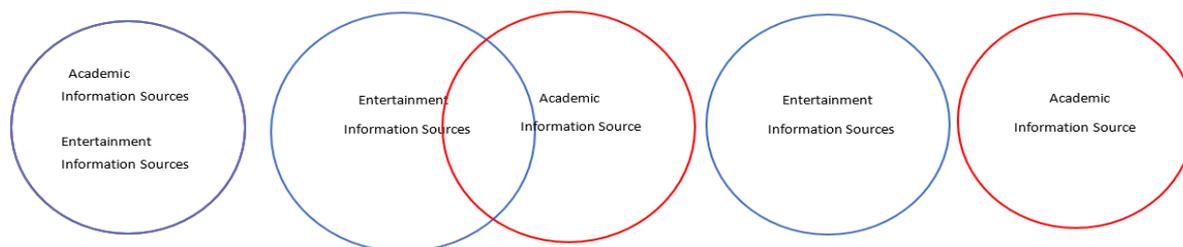
Currently, research on mental accounting in the information domain remains limited. However, some scholars have noted similarities between monetary and informational consumption. On one hand, they focus on the role of mental accounting classification characteristics in information behaviors. For instance, Chu Wentao (2019) [7] suggested integrating mental account categorization into the theory of usage satisfaction to address user satisfaction in complex media recommendation scenarios and proposed the "media category account" concept, positing that individuals derive satisfaction from different media categories rather than through the aggregation of generalized satisfaction. Shen Tingting (2021) [8] argued that when sharing scientific data with acquaintances, individuals evaluate gains and losses using an emotion-oriented mental accounting, whereas when sharing with strangers, they employ a benefit-oriented mental accounting. On the other hand, research focuses on the role of mental accounting "gain-loss" balance concept in information behavior. For instance, Sang-Hyeak Yoon (2023) [9] examined factors influencing users' avoidance and viewing of online advertisements based on the time-based mental accounting balancing gains and costs. Namho Chung (2015) [10] investigated factors affecting tourism adoption of internet search information from the perspective of the interplay between benefits and sacrifices of new technologies, grounded in prospect theory and mental accounting theory. Fei Jian (2015) [11] analyzed value judgments and behavioral

choices in new media usage from a mental accounting perspective, proposing that individuals categorize new media use into “gain” and “loss” mental accounting. The “gain” account encompasses aesthetic entertainment and practical functions, while the “loss” account includes monetary, time, and informational risks, each governed by distinct evaluation criteria. Yu Guoming (2021) [12] argued that media consumption becomes highly personalized, the time mental accounting can serve as a crucial reference for measuring media consumption, while highlighting the consumption characteristics of media, this work also introduces the concept of mental accounting into the field of media consumption. The above studies indicate that researchers have recognized the similarities between information behavior and monetary consumption behavior, and have attempted to use mental accounting theory to explain information behavior.

Despite these similarities, information and money possess also distinct characteristics. From an acquisition perspective, information is shareable acquired information (or sources) can be allocated across multiple accounts, whereas money is typically assigned to a single account; from an expenditure perspective, the perceived loss of time expended on obtaining information differs from monetary expenditure, generally exhibiting lower time loss sensitivity (Yang Liangxia, 2009) [13]. The distinctiveness of information prevents us from directly applying the rules governing monetary mental accounting to information. Previous research has lacked independent studies on the unique characteristics of information mental accounting. Building on prior work, this paper investigates the implicit structure and features of information mental accounting, further examining their cognitive influences and unique information behaviors. The aim is to uncover patterns in user behavior and optimize information services.

### 3. Characteristics of Information Mental Accounting

Information mental accounting possess certain essential characteristics that confer their uniqueness and serve as the root cause of either facilitating or disrupting people’s information decision-making behaviors. Revealing these



**Figure 1:** Schematic Diagram of the Relationship Between Academic and Entertainment Information Sources

#### (2) Non-Substitutability of Academic and Entertainment Information Sources

For respondents who selected overlapping entertainment and academic information sources (66 individuals), a follow-up question was posed: “I believe the non-overlapping sections in the diagram below are mutually non-substitutable” (Figure 2). Results showed 49 respondents (74.24% of total) agreed, 4 respondents (6.06% of total) disagreed, and 13 respondents (19.69% of total) were uncertain.

essential characteristics enables a deeper understanding of the underlying reasons for information behaviors.

### 3.1 Research Methods for the Characteristics of Information Mental Accounting

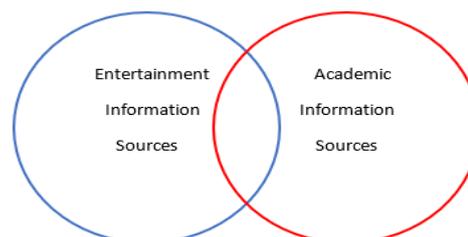
A preliminary study using questionnaires explored and verified whether “stable classifications exist in individual information behaviors, and whether these classifications are mutually exclusive,” which forms the foundation for establishing information mental accounting. (2) The formal study employed literature review, individual interviews, and focus groups, combined with established scales, to develop a scale measuring information mental accounting characteristics. Subsequently, questionnaire surveys were conducted, utilizing exploratory factor analysis and confirmatory factor analysis to reveal the characteristics of information mental accounting.

### 3.2 Preliminary Study

Visual Exploration Using Graphics: Red and blue circles represented distinct information mental accounting—red for academic information mental accounting (containing academic information sources) and blue for entertainment information mental accounting (containing entertainment information sources). Through graphic descriptions and questioning, participants visually demonstrated the classification and non-substitutability of information mental accounting. Results are as follows:

#### (1) Classification Relationship Between Academic and Entertainment Information Sources

For the question “Regarding the relationship between academic and entertainment information sources, which scenario best reflects your actual situation?”, Figure 1 for graphic choices. Results showed: 3 participants (4.17%) selected “complete overlap between entertainment and academic sources”; 66 participants (91.67%) selected “partial overlap between entertainment and academic sources”; 3 participants (4.17%) selected “complete non-overlap between entertainment and academic sources”.



**Figure 2:** Schematic Diagram of Substitution Relationships

### Between Entertainment and Academic Information Sources

Experiments indicate that most of individuals mentally categorize information based on its purpose, and most people perceive different information mental accounting as non-substitutable. Simultaneously, some information sources can be assigned to multiple mental accounting (the overlapping areas in Figure 2). This reflects the fundamental difference between information and money, while money is typically confined to a single use, the shared nature of information allows the same source to be utilized across multiple mental accounting.

### 3.3 Information Mental Accounting Characteristics Scale

Through reviewing literature on “mental accounting,” conducting individual interviews (10 undergraduates) and focus group discussions (7 master’s students), and referencing Li Aimei (2006) [5] Mental Accounting Trait Scale and Liu Xiaoxiao (2013) [14] Time Cost Perception Scale, an initial questionnaire comprising 19 items was developed to measure information mental accounting characteristics. This questionnaire is organized into four dimensions: Non-substitutability, Time Mental Budgeting, Flexibility and Low Perceived Cost of Time.

### 3.4 Data Collection and Analysis of Information Mental Accounting Characteristics

The formal survey utilized the Wenjuanxing platform, targeting 363 undergraduates. After excluding items with excessively short response times, the valid sample size was 350 participants, yielding a response rate of 96.42%. Demographic characteristics are presented in Table 1. A random sample of 120 participants underwent exploratory factor analysis, while the remaining 230 samples were used for confirmatory factor analysis. Exploratory factor analysis was employed to explore the characteristic structure, followed by confirmatory factor analysis to validate the structural model.

**Table 1: Demographic Characteristics of the Sample**

Item	Category	Number	Percentage
Gender	Male	157	44.86%
	Female	193	55.14%
	Freshman	72	20.57%
Grade	Sophomore	85	24.29%
	Junior	120	34.29%
	Senior	73	20.86%

Exploratory factor analysis yielded Cronbach’s  $\alpha$  is 0.806, KMO is 0.747, and Bartlett’s test value is 609.99. Analysis resulted in merging the “non-substitutability” and “flexibility” dimensions into “alternat,” removing 7 items, and retaining 12 items. The total variance explained is 63.716%, as shown in Table 2. The three factors are named “alternat,” “time mental budgeting,” and “low perceived cost of time”.

**Table 2: Exploratory Factor Analysis of Information Mental Accounting Characteristics**

Feature	Measure Items	Factor Loadings	Cronbac’s $\alpha$
Itermate (AL)	AL1 Sometimes I try new information platforms purely out of curiosity, just to see how they work	0.832	0.778
	AL2 I flexibly choose information sources based on how well they meet my information needs	0.723	
	AL3 I differentiate the uses of information platforms	0.712	
	AL4 I differentiate between sources for study/work, leisure/entertainment, and social interaction	0.526	
Time Mental Budgeting (TB)	TB6 I habitually review the value of a book or article after finishing it.	0.878	0.797
	TB5 I have a habit of regularly summarizing my study and work progress	0.697	
	TB3 I allocate specific time budgets for study and work	0.694	
	TB1 My time is planned and organized	0.593	
Low Perceived Cost of Time (LPC)	TB4 My study and work activities are pre-scheduled	0.520	0.780
	LPC1: The time spent acquiring academic information does not make me feel a sense of loss.	0.867	
	LPC2: I do not notice the time cost when acquiring academic information	0.845	
	LPC3: I do not feel distressed about the time spent acquiring information	0.767	

The fit indices derived from the AMOS analysis indicate excellent model fit, as shown in Table 3.

**Table 3: Model Fit Indices for the Confirmatory Factor Analysis Model of Information Mental Accounting Characteristics**

Fit Index	df/ $\chi^2$	RMSEA	GFI	AGFI	CFI	NFI	RMR
Evaluation Criteria	<3	<0.08	>0.9	>0.9	>0.9	>0.9	0.08
Result	2.258	0.074	.924	0.884	0.947	0.911	0.059

### 3.5 Characteristics of Information Mental Accounting

Analysis indicates that the characteristics of information mental accounting encompass three factors: “alternation”, “time mental budgeting” and “low perceived cost of time”.

(1) Alternation (AL). Alternation refers to the flexible and unrestricted switching between non-substitutability and iterativity within information mental accounting. In previous mental accounting frameworks, non-substitutability meant money could not be freely transferred between accounts. Flexibility refers to the adaptability of mental accounting operations and classifications, which vary across different time periods and economic conditions. Furthermore, the timing of establishing an account and when it is settled is influenced by an individual’s self-control. This paper argues that in traditional mental accounting, flexibility is constrained. For instance, to transform an ordinary dinner into a gourmet feast flexibly moving money from a daily account to a pleasure account—an individual needed a special justification like an anniversary or birthday. This stemmed from money’s non-shareability, ultimately confining spending from a single

account and need careful consideration. Information differs from money in its shareability. Sharing information (sources) across accounts incurs no cost, leading to numerous hybrid information sources. Information mental accounting features both a stability phase when account information sources are non-substitutable and an iteration phase when sources within accounts undergo flexible, unrestricted updates.

(2) Time Mental Budgeting (TB). The budgeting aspect of mental accounting refers to individuals pre-setting budgets for their wealth or time, such as determining monthly expenditure limits. Time mental budgeting in this paper refers to the cognitive process by which individuals allocate budgets for time across different information mental accounting and track time expenditures within each account. Time mental budgeting comprises two steps: budgeting and settlement. The former involves setting budgets, while the latter tracks outcomes.

(3) Low Perceived Cost of Time (LPC). The cost of time refers to the time individuals expend when using media to obtain information, viewed as the cost paid for acquiring information. In irrational decision-making, people exhibit “loss aversion” toward monetary payments—meaning they are more sensitive to the experience of loss than to the experience of gain, and the pain of losing outweighs the pleasure of gaining. In research on information mental accounting, we find that people generally exhibit lower loss aversion toward time usage costs. Sometimes, individuals even overlook the existence of time usage costs, perceiving the time spent acquiring information as “not painful.” This low cost perception also facilitates higher iteration frequency of information sources within accounts, promoting alternating updates.

## 4. Implicit Structure and Matching Patterns of Information Mental accounting

### 4.1 Implicit Structure of Information Mental Accounting

#### 4.1.1 Research Methods for Implicit Structure

To investigate the implicit structure of information mental accounting and the distinct evaluation criteria for each account, this study adopted Li Aimei’s (2006) methods for examining mental accounting structure. Beyond literature review, three approaches were employed to collect classification methods: open-ended questionnaire, focus group discussion, and semi-structured interview. Open-ended questionnaires and focus groups gathered as more information mental accounting classification as possible, while semi-structured questionnaire supplemented these classifications through graduate students with higher education. Analysis yielded the two-dimensional structure and evaluation criteria of information mental accounting.

#### 4.1.2 Implicit Structure Data Collection

(1) Open-ended questionnaire.

In daily life, people typically categorize information for use and management based on their own standards (or principles). For example, they may classify information by medium type: mobile social media (TikTok, Weibo, WeChat), computer websites, television, newspapers, libraries, literature databases, etc.; or by acquisition method: actively searched, recommended by others, accidentally discovered, system recommended, etc.

Question: In your daily life, what perspectives do you (or people around you) use to categorize information? List the contents included in each category, sharing as many examples as possible.

A total of 130 undergraduate students participated in the questionnaire survey.

(2) Focus Group Discussion.

Method: Groups of five undergraduates were formed.

Opening Remarks: Consumer psychology features a concept called mental accounting, which involves organizing, categorizing, budgeting, and evaluating individual economic behaviors. Mental accounting theory suggests individuals establish distinct accounts based on the source of money, with funds in different accounts being non-substitutable. In daily life and study, we also consume information—investing time to acquire it, where time serves as our cost, and information brings value. This process similarities with monetary consumption. Do we have an “information mental accounting” in our psychology? Please discuss how you categorize information.

(3) Semi-Open Questionnaire

After organizing the results from steps (1) and (2), they were presented to participants of the semi-open questionnaire. They were asked: “Do you mentally categorize information into these accounts? If you believe additional categories are needed, please add them at the end of the questionnaire.” A total of 25 graduate students participated in the survey.

#### 4.1.3 Two-Dimensional Structure of Information Mental accounting and Evaluation Criteria

We summarized the survey results as shown in Table 4. Findings indicate individuals categorize information mental accounting into two dimensions: information demand (purpose) and information source. Based on frequency of mention, accounts can be grouped by information demand into three categories: academic/work, life/entertainment, and social. Correspondingly, information demand mental accounting are classified as academic/work, entertainment, and social mental accounting, with evaluation criteria for each. Additionally, we identified 32 common information sources, each of which can be regarded as an information source mental accounting.

**Table 4: Implicit Structure and Evaluation Criteria of Information Mental accounting**

Information Need (usage) Dimension	Information Source Dimension	Account Evaluation Criteria
1. Study/ work, life/ entertainment, interpersonal socializing	1. Electronic journal databases, 2. Academic conferences, 3. Specialized subject websites, 4. Patent literature, 5. Technical reports, 6. Books and newspapers, 7. Government publications, 8. Libraries, 9. Statistical data, 10. Professional training, 11. Forums, 12. Zhihu, 13. Personal experience, 14. Television, 15. Posters and flyers, 16. Live video streaming, 17. Tieba, 18. Games, 19. Radio, 20. Blogs, 21. Kuaishou, 22. Bilibili, 23. WeChat, 24. Email, 25. Non-academic websites, 26. Search engines, 27. Douyin, 28. QQ, 29. Official Accounts, 30. Xiaohongshu, 31. Interpersonal communication, 32. WeChat	1.Trustworthy,
2. Information content needs, information service needs, access channel needs		2.Accurate,
3. Information needs in daily life, professional work, and social interactions		3.Authoritative,
4. Work-related needs, daily needs		4.Authentic,
5. Basic applications, business transactions, online finance, online entertainment, and public services		5.Valuable,
6. Professional information needs, non-professional information needs		6.Useful,
7. Entertainment, knowledge, and social networking		7.Important,
	8.Practical,	
	9.Low time cost, 10.User-friendly platform,	
	11.Quick feedback, 12.Familiar habits,	
	13.High engagement, 14.Strong interactivity,	
	15.Relevance,	
	16.Applicability, 17.Accessibility,	
	18.Completeness,	
	19.Depth,	
	20.Breadth,	
	21.Fresh content,	
	22.Interesting,	
	23.Makes me happy,	
	24.Relaxes me	

**Table 5: Top 10 Sources of Three Information metal Accountings**

Study/Work Account	Number	Percentage	Life/Entertainment Account	Number	Percentage	Social Account	Number	Percentage
Library	90	68.00%	Weibo	73	56.06%	QQ	76	57.58%
Electronic Journal Database	73	56.06%	Bilibili	66	50.00%	WeChat	73	56.06%
Professional Discipline Websites	62	46.97%	Television	60	45.45%	Interaction with others	48	36.36%
Related Websites	62	46.97%	WeChat	60	45.45%	Weibo	42	31.82%
Patent Literature	60	45.45%	TikTok	60	45.45%	TikTok	42	31.82%
Interaction with Others	60	45.45%	Xiaohongshu	60	45.45%	Bilibili	35	25.76%
Official Account	55	42.42%	QQ	54	40.91%	Xiaohongshu	32	24.24%
Books and Newspapers	54	40.91%	Kuaishou	52	39.39%	Attending academic conferences	29	22.73%
Search engine	54	40.91%	Official Accounts	46	34.85%	Library	26	19.70%
Attending Academic Conference	46	34.85%	Library	44	33.33%	Official Account/Zhihu	26	19.70%

## 4.2 Matching Model for Information Demand Accounts and Information Source Accounts

Based on the structure of information mental accounting, this study explores the relationship between information demand mental accounting and information source mental accounting: (1) Considering information source selection and screening criteria from the perspective of demand; (2) Considering which demands are satisfied from the perspective of the source. Different information demand (purpose) mental accounting employ distinct evaluation criteria for selecting information sources. Information sources can serve independent or mixed purposes. Independent information sources primarily fulfill specific information demands and belong to specific information demand mental accounting.

### 4.2.1 Research Methods for Matching Patterns

Two separate studies were conducted: (1) Considering from the demand perspective which information sources are included in the information demand mental account and what the selection criteria are. Using a questionnaire survey method, 132 undergraduates were surveyed. They were asked to select information sources from the 32 commonly used sources listed in Table 1 for use in academic work, daily life/entertainment, and social activities, respectively. They also selected the three most appropriate evaluation terms from 24 options and ranked them in order. (2) From the source perspective, we examined how to allocate information sources to the most suitable demand accounts. We proposed an

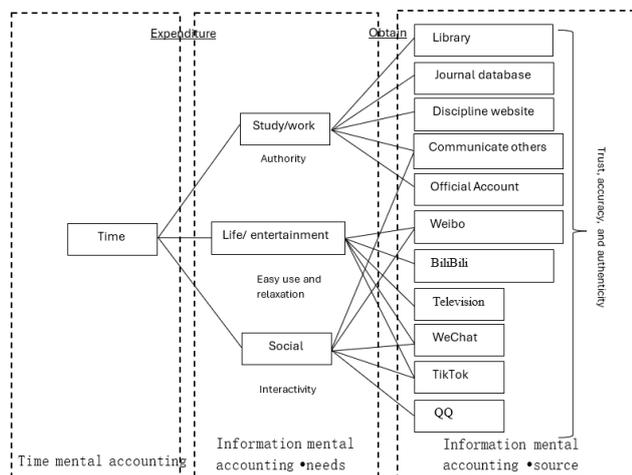
independence index of information source to determine whether a source belongs to an independent account or a mixed account. If it belongs to an independent account, we further identified its primary affiliation with a specific information demand mental account. Through a survey of 108 undergraduates, we categorized the 32 common information sources.

### 4.2.2 Account Matching Patterns from the Demand Perspective

For the three categories of information demand accounts, we selected information sources and their screening criteria, identifying the top ten sources for the Study-Work Account, Life-Entertainment Account, and Social Account, as shown in Table 5. The top three evaluation criteria for this account are Trust (40 mentions), Accuracy (34), and Authority (32). The top three evaluation criteria for life/entertainment accounts (with two criteria tied) were accuracy (20 mentions), authenticity (20), platform usability (12), and relaxation (12). The top three evaluation criteria for social accounts were trust (28), authenticity (16), and strong interactivity (14).

The findings reveal that trust, accuracy, and authenticity are indispensable requirements for any informational metal accounting. Beyond these, the study/work account prioritizes the authority of information sources, the life/entertainment account emphasizes ease of use and relaxation, and the social account focuses on interactivity. To comprehensively evaluate the acquisition and expenditure of informational

mental accounting, time is introduced as a cost factor. Previous research has proposed the concept of time mental accounting, which refers to the psychological processes of categorizing, coding, evaluating, and allocating time, characterized by “non-substitutability” and “budgetary” properties [15][16]. Time expended on information acquisition is allocated according to information demand accounts, divided into study/work time, life/entertainment time, and social time. The final information mental accounting structure is shown in Figure 3 (displaying only partial information sources).



**Figure 3:** Information Mental Accounting Structure in the Demand Dimension

From the expenditure perspective, time is allocated according to demand accounts, consistent with previous research. From the acquisition perspective, each demand account has its specific information sources. Some sources belong exclusively to one demand account category, while others may belong to multiple accounts simultaneously. A new question arises: For a specific information source, how do we determine whether it is an independent source belonging to a single account or a mixed source belonging to multiple accounts? This paper will address this through account matching from the source perspective.

4.2.3 Source-Based Account Matching Model

This paper proposes an information source independence index, denoted by the letter I (Independent), representing the degree to which a source serves a single purpose. If the source is single-purpose, it is further assigned to a specific demand account; if it is mixed-purpose, no specific assignment is sought, and calculations follow Formula 1. Here, D(Demand) denotes times the source was selected for a particular demand. For example, if an electronic journal database was used solely for academic /work by 50 individuals, then  $D_{Academic/Work} = 50$ .  $D_{Study/Work}$ ,  $D_{Life/Entertainment}$ , and  $D_{Social}$  respectively indicate the number of times the information source was selected solely for study/work, life/entertainment, and social purposes.  $D_{Study/Work+Life/Entertainment}$ ,  $D_{Study/Work+Social}$ , and  $D_{Social+Life/Entertainment}$  respectively indicate the number of times the information source was selected simultaneously for study/work and life/entertainment, study/work and social, social and life/entertainment.  $D_{Study/Work+Life/Entertainment+Social}$  represents the number of times the information source was selected for study/work, life/entertainment, and social

purposes simultaneously. S (Sum) denotes the total number of times the information source was selected:  $S = D_{Study/Work} + D_{Life/Entertainment} + D_{Social} + D_{Study/Work+Life/Entertainment} + D_{Study/Work+Social} + D_{Social+Life/Entertainment} + D_{Academic/Work+Leisure/Entertainment+Social}$ . Results are categorized into four account types using a quartile method, representing the independence level of a specific information source:  $0.75 < I \leq 1$  denotes an absolutely independent account,  $0.5 < I \leq 0.75$  indicates a relatively independent account,  $0.25 < I \leq 0.5$  signifies a relatively mixed account, and  $0 < I \leq 0.25$  represents an absolutely mixed account. The calculated independence indices for each information source are shown in Table 6.

$$I = (D_{Study/Work} + D_{Life/Entertainment} + D_{Social}) / S \quad (1)$$

**Table 6:** Information Source Independence Index

Absolute Independent Account	Relatively Independent Accounts	Relatively Mixed Accounts	Mixed
Science and Technology Reports 0.9	Library 0.7	Academic Conferences 0.5	
Posters and Flyers 0.9	Professional Training 0.7	Related Websites 0.5	
Video Streaming 0.9	Radio Broadcasts 0.7	Search Engines 0.5	
Baidu Tieba 0.9	Kuaishou 0.7	Douyin 0.5	
Email 0.9	Zhihu 0.7	QQ 0.5	
Electronic Journal Database 0.8	Personal Experience 0.7	WeChat Accounts 0.5	Official
Professional Discipline Websites 0.8	Statistical Data 0.7	Xiaohongshu 0.5	
Patent Literature 0.8	Blogs 0.7	Peer Discussions 0.4	
Government Publications 0.8	Weibo 0.6	WeChat 0.3	
Television 0.8	Forums 0.6		
Games 0.8	Bilibili 0.6		
	Books and Newspapers 0.6		

Information sources of mixed accounts serve multiple purposes and thus are not further subdivided. Independent accounts carry “preferences” for users, leading to the three specific independent indices: the Independent Index for Study/Work Information Sources, the Independent Index for Life/Entertainment Information Sources, and the Independent Index for Social Information Sources, as shown in Formulas 2–4. By comparing these three specific independent indices for a given information source, it is assigned to the demand account yielding the highest calculated result.

Independent Index for Study/Work Information Sources:

$$I_{Study/Work} = D_{Study/Work} / (D_{Study/Work} + D_{Life/Entertainment} + D_{Social}) \quad (2)$$

Independent Index for Life and Entertainment Information Sources:

$$I_{Life/Entertainment} = D_{Life/Entertainment} / (D_{Life/Entertainment} + D_{Social}) \quad (3)$$

Social Information Source Independence Index:

$$I_{Social} = D_{Social} / (D_{Study/Work} + D_{Life/Entertainment} + D_{Social}) \quad (4)$$

Through calculation, we allocated information sources from absolute independent accounts and relative independent accounts to different information demand mental accounting, as shown in Table 7 (bold indicates absolute independent account).

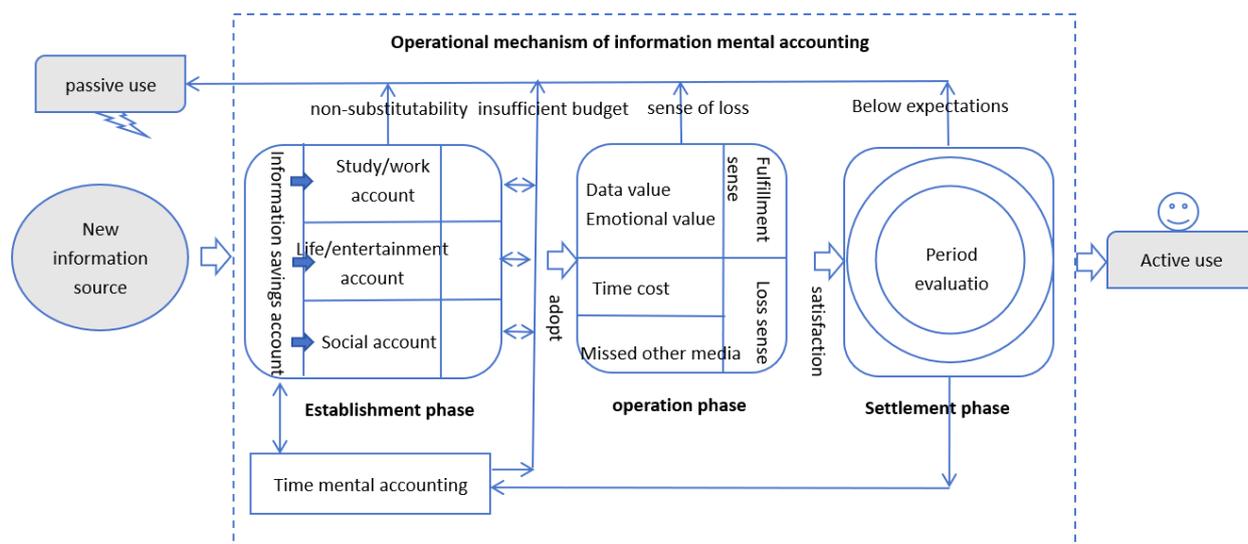
**Table 7:** Allocation of Independent Information Source  
Mental accounting

Study/Work Account	Life /Entertainment Account	Social Account
Electronic journal databases, specialized subject websites, patent literature, technical reports, government publications, statistical data, books/newspapers, professional training, forums, Zhihu, personal experience	Television, posters/flyers, live video streams, Tieba forums, games, radio, blogs, Kuaishou, Bilibili, Weibo	Email

Results indicate that information sources attributed to the Study/Work Account include 12 items such as electronic journal databases; those attributed to the Life/Entertainment Account include 10 items such as television; and those attributed to the Social Account include 1 item such as Email.

### 5. Mechanism of Mental Accounting

Traditional mental accounting comprises three key components: first, the classification of specific accounts, involving account origins and expenditures, with spending accounts governed by explicit or implicit budgets; second, the evaluation and trade-offs within mental accounting; and third, the perception and experience of outcomes (Thaler, 1999). Subsequent research has summarized these into three stages: account creation, operation, and closure (Liu Pei, 2019). Integrating the characteristics and structural research of information mental accounting, the operational mechanism of information mental accounting is illustrated in Figure 4.



**Figure 4:** Operational Mechanism of the Information Mental Accounting

(1) The establishment phase involves matching new information sources with the mental accounting that require them. A single information source may match one or multiple accounts, with matching guided by the “representativeness principle.” That is, the more typical an information source is for a given account (as measured by the source’s independence index), the more likely it is to be allocated to that account and assigned a higher weight. Account establishment exhibits alternating phases: a stable period where information sources cannot substitute across accounts, and an iterative period where account establishment can be updated. Individuals allocate time budgets to each account, creating competition between traditional media and new information sources for this budget. Unmatched demand accounts face restrictive usage due to non-substitutability. If an account contains too many traditional media sources, leading to insufficient time budget, individuals may also develop negative attitudes toward using new information sources.

(2) The operational phase involves the use of newly incorporated information sources, emphasizing the trade-off between “gain perception” and “loss perception” during immediate use. Gain perception primarily stems from the data value and emotional value of new sources, while loss perception mainly arises from time costs. Due to the low perceived time cost associated with information mental

accounting, compared to monetary consumption, the loss from time consumption is less noticeable. As long as individuals gain data or emotional value from the information source even if minimal the sense of gain can outweigh the sense of loss. However, previous research indicates that under specific conditions where time costs are linked to monetary value, individuals perceive higher time costs, increasing the sense of loss from time consumption. If the perceived cost loss exceeds the sense of gain, negative usage occurs.

(3) The settlement phase occurs after an individual has used the new information source for a period of time. During this phase, they evaluate the time spent to assess whether the psychological budget allocated to the time investment has achieved the expected results. If the results meet expectations, a positive psychological perception of the new information source is formed, leading to positive usage behavior. Conversely, negative usage occurs.

### 6. Implications for Applying Information Mental Accounting

#### 6.1 Application of Information Mental Accounting: A Case Study of New Media Adoption Behavior

Previous research on mental accounting has primarily focused on its influence on consumer decision-making. Individual

decisions regarding media adoption represent a significant research topic in the field of user information behavior. Taking new media adoption as an example, this study explores the application of information mental accounting in the domains of user information decision-making and behavior.

New media, represented by social media, has become an objective information environment accompanying individuals. Compared to traditional media, new media not only encompasses a wide variety of formats but also undergoes rapid updates and iterations. Recent developments include emerging concepts such as the metaverse and virtual reality. Amidst this landscape of diverse voices, how individuals select media platforms has become a critical issue of concern for both scholars and platform operators. Previous studies on information system adoption have largely relied on the rational actor hypothesis. In particular, the concepts of usefulness and ease of use proposed by the Technology Acceptance Model (TAM) have been adopted as primary influencing factors in new media adoption research. However, in the social media environment, individual adoption and use of new media do not manifest as purely rational. For instance, older adults may resist using new media in work settings, even perceiving it as increasing their workload, despite younger generations viewing such platforms as highly beneficial for study and work. Previous research attributed this discrepancy to older adults' lack of experience with similar platforms [17], a finding corroborated in academic circles [18]. However, another study indicates that older adults adopt new media for social purposes at rates indistinguishable from younger users [19]. Thus, factors like age, experience, perceived usefulness, and ease of use cannot fully explain these discrepancies in the new media environment nor determine individual adoption decisions.

Based on the findings of this study, we offer a new interpretation: First, from the source perspective, the account matching model reveals that most social media platforms fall under "relatively mixed accounts". This indicates social media often serves multiple purposes, allowing individuals to match them to different mental accounting for needs like study/work, life/entertainment, and social with the diverse choices of both older and younger users. Second, from the demand perspective, information mental accounting form a "time cost-information need-information source" matching pattern. Time, as an expenditure cost, allocates (time) budgets according to information needs. Since the (time) budget is finite, the more existing sources within that account, the lower the likelihood of accepting new sources under the same budget constraints. Older adults, having longer work histories than younger individuals, possess more established information sources within their study/work mental accounting, making them less inclined to incorporate new media into this account. Finally, as noted by , when new media like social platforms first emerged, their content primarily focused on leisure and social interaction. Consequently, they were labeled as "leisure/social" and assigned to corresponding mental accounting among older adults. Due to the non-substitutability between mental accounting, even as social media evolved to enhance practical features suitable for work scenarios, the entrenched "labeling" persisted. Consequently, they readily accept social media for

entertainment and socializing but struggle to adopt it for work purposes.

## 6.2 Implications of Mental Accounting

Building upon an understanding of the implicit structure, matching pattern, and application of information mental accounting, this study proposes further consideration to enhance user behavior research in contemporary information environments and assist media platforms in refining operational strategies.

(1) In an era marked by the proliferation of media platforms, prioritize understanding the impact of irrational behaviors like information mental accounting on individuals. Compared to traditional academic settings, the emergence of social media significantly increases uncertainty in navigating new environments, creating greater discrepancies between theories grounded in the rational agent assumption and real-world outcomes. Theories based on rational agents struggle to explain variations in individual information decisions and behaviors within these new contexts. The mental accounting theory's framework "categorization into mental accounting creates cognitive differences that influence behavioral decisions" applies not only to economics and consumption but also to the information domain. Individuals categorize information sources for different purposes. Considering themes from an account classification perspective offers new explanations for individual information behavior differences in this new environment and provides fresh angles for future research in related fields.

(2) The multifaceted data value of media content warrants in-depth examination from the perspective of users' information mental accounting. Media data value has garnered attention in recent years [20][21], with the benefits derived from this value being a current research focus. Data usage influences its value [22]. It is necessary to investigate the differing data values of the same medium for diverse purposes based on user needs. Understanding which information mental accounting a medium belongs to is fundamental for studying differentiated data value. This paper proposes an information source independence index using quantitative methods to reveal the usage attribution of the same medium. Based on this, the data value of the medium for different information needs can be further calculated.

(3) Guard against non-substitutability fostering rigid cognition and old-media attachment, which can lead to negative media usage. Media functions are increasingly diversifying, evolving from entertainment and socializing toward practical, work-related, and knowledge-based applications (data). Concurrently, we must guard against the non-substitutability between information mental accounting, which can solidify perceptions of media uses. This may lead individuals to avoid or restrict the use of new media functions, resulting in potential losses. Individuals allocate time across distinct information mental accounting, creating time budgets. As time is a finite resource, more time is allocated to "old" media within a given account—especially when individuals exhibit old media attachment (emotional bonds formed through past usage). Consequently, less time is allocated to "new" media, reducing its adoption likelihood.

(4) Establishing a media tag library and recommendation system tailored to individual needs. Currently, addressing corporate market demands, employs media attribute tags and execution tags from its comprehensive media library, using logical operations to determine selected media types [23]. This study argues that amid the proliferation of media platforms, such services can also be provided to individuals—particularly by information service institutions like libraries—enabling personalized media (combination) recommendations based on individual information needs. Recommendation first requires quantitative methods to classify media by demand, generating real-time classification tags. The proposed Information Source Hybrid Index explores this approach, particularly emphasizing the need for clear quantitative classification standards when media possess multifunctional and hybrid uses. Future work can refine classification metrics for hybrid uses to enable real-time monitoring and media combination recommendations based on user needs.

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