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UNDERUSED RESOURCES AND COMPANIES' GROWTH: THE INFLUENCE OF DIGITAL TRANSFORMATION AND DECISION-MAKING ABILITY

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Abstract. In the digital economy era, diverse resources remain a critical asset for businesses aiming to boost their competitiveness and secure sustainable growth. Organisational slack, as an underused resource, has increasingly captured researchers' interest, with varying impacts attributed to different types of slack. Using data from Chinese A-share listed firms from 2011 to 2019, this study discusses the influence of slack resource on companies' growth and the mechanisms of their effects in the digital setting. We conducted an empowering regression analysis with two-factor fixed effects on the dataset and found that absorbed slack facilitates companies' growth, whereas unabsorbed slack may hinder it. Simultaneously, managers with strong decision-making ability and deep digital transformation are also conducive to absorbed slack for organisational growth. A real case from a traditional coal mine company was conducted to confirm our findings and make additional discoveries. We contribute to the academic discourse by offering practical guidance for businesses on the strategic use of slack resources and integrating digital transformation initiatives.

Keywords: digital transformation; underused resources; organisational slack; organisational growth; management decision-making ability

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JEL Classifications: M10, M21, J24

1. Introduction

In the digital economy era, competing for resources is still an important goal in the transformation and upgrading stages of firm development. To achieve long-term strategic objectives, firms need to utilise resources to meet the constant challenges of the market in a dynamic environment (Chen & Hao, 2022; Essuman et al., 2022). Then, more and more companies begin to notice organisational slack when taking strategic actions.

Organisational slack is often described as the excess resources a firm needs in excess of its daily operations. Existing studies have mainly focused on operational efficiency, financial performance, organisational change, R&D investment, knowledge output (Agusti-Perez, Galan & Acedo, 2020; Boso et al., 2017; Carnes, et al. 2019). However, based on Resource Dependence Theory (abbreviated as RDT), as an idle resource, organisational slack can be integrated with external technology and resources in the process of use (Suzuki, 2018; Titus, O'Brien & Dixit, 2022). It can become a valuable heterogeneous resource that affects a firm's long-term development of the firm. Nevertheless, there has not been much research exploring this topic.

Based on Upper Echelons Theory (UET), the use of resources is closely related to managers. Managers should make heterogeneous resources valuable by regulating them rationally (Francis et al., 2022). Owing to differences in the adoption of digital technologies and managers' analytical capabilities, Different managers make different decisions (Gavetti et al., 2012). Effective decisions are directly related to short-term business performance, while major decisions will affect long-term strategic development (Francis & Wu, 2022). Thus, decision-making ability explains how organisational redundancy is used within the organisation and affects long-term organisational growth.

It is critical for firms seeking to enhance their core competitiveness by how to combining resources with digital technology to conducting digital transformation in the digital economy (Feliciano-Cestero et al., 2023; Gao, Lin & Zhai, 2022). The point of digital transformation is to introduce external digital technologies into operations, helping firms achieving more decision-making approaches and growing their performance (Ferreira, Fernandes, & Ferreira, 2019; Wu, Fu & Kong, 2022). As a result of digital transformation, Significant changes in the way organisational slack is leveraged and valued (Ferreira et al., 2019). In this context, it is a theoretical and practical question to answer how organisational slack, as an idle resource, can meet digital technology and realise effective use to promote the growth of the organisation.

Based on the above description, we propose two main research questions: (1) Whether different types of organisational slack can help organisations grow; (2) What is the role of decision-making ability and digital transformation in this process. Based on Resource Dependence Theory (RDT) and Upper Echelons Theory (UET), we established theoretical frameworks and models to explain these problems. We use a dataset of 14,041 company-year observations, containing 1,520 China's A-shares listed companies. Our results suggest that organisational slacks have negative effects on organisational growth in the long term. We also found that decision-making ability can help control the negative effects of absorbed slack on organisational growth. Moreover, the relationship between decision-making ability and digital transformation weakens the impact of unabsorbed slack on organisational growth from both internal and external perspectives, effectively mitigating the negative effects of unabsorbed slack.

This study makes several contributions to the literature. First, we explore the relationship between organisational slack and organisational growth from the perspective of multidimensional classification. Organisations' long-term growth has different organisational slack requirements. Thus, it provides empirical support for the economic and strategic impacts of different organisational slack. Second, our study provides a research approach to the cultivation process, not only of organisational slack on economic and strategic effects, but also on long-term organisational resilience. From the perspective of Resource Dependence Theory and Upper Echelons Theory, we introduced digital transformation and decision-making ability to analyse how they affect the layout and utilisation of organisational slack. Our study enriches research on organisational slack and growth by highlighting the importance of managers and digital transformation for organisational growth. Last but not least, we suggest that organisations focus on digital transformation practices. The use of digital technologies, such as big data and cloud computing, in digital transformation can help managers adjust the use of organisational redundancy in strategic decisions, assisting businesses to achieve strategic goals and organisational growth.

2. Theoretical background

2.1 The benefits of organisational slack for organisational growth

For businesses, organisational slack can be used as a motivator for survival, a buffer in the face of a crisis, and a specific strategic resource to help grow (Bourgeois, 1981; Titus et al., 2022). Unabsorbed and absorbed slacks have different effects on organisational performance, which has long been recognised by scholars (Titus et al., 2022). This is mainly due to the fact that absorbed slack is a restricted resource with a specific use, such as idle machinery, excess inventory, etc.. In contrast, unabsorbed slack is much more versatile, liquid and easy to redeploy, specifically cash and securities (Suzuki, 2018). Resource dependence theory suggests that firms are able to utilise internal resources to bring a range of competitive advantages to themselves. Organisational slacks, as idle resources, are underutilised heterogeneous resources. Rather than ordinary resources, which take a while to transform into what the firm needs, the slack can be used quickly when needed (Barney, 1991).

In view of short-term operations, unabsorbed slack facilitates growth in business performance. Tognazzo et al. (2016) found that financial slack (i.e., unabsorbed slack) can drive firm profitability when facing external environmental shocks. However, it is worth noting that organisational growth as a long-term strategic direction, if too much unabsorbed slack is held for a long period of time, i.e., the firm owns very abundant funds, resulting in managers are prone to form a dependence on organisational slack, and thus overly develop the firm's business horizontally, massively exploit the non-core new products and uncontrollably expand the new markets, so that it is difficult to ensure that the firm focuses on the operation of its core business and the R&D investment in its core products, and the firm fails to achieve centralised development (Vanacker, Collewaert & Zahra, 2017; Duan, Wang & Zhou, 2020; Zhao et al., 2024). Having developed a dependency, managers also have a preference for high-risk investments in innovation, which is not conducive to long-term organisational growth.

Absorbed slack is known to be a slack resource for exclusive functions within a firm and is formed to meet specific purposes, such as idle inventory, specialised machinery, and special talents (Bao et al., 2020). These absorbed slacks, because they are less liquid than unabsorbed slacks, are less likely to be used at the discretion of managers, which may limit organisational flexibility and adaptability (Titus et al., 2022). In a rapidly changing market environment, highly dedicated slacks are difficult to adapt quickly to new needs, thus impeding the rapid growth of the organisation. Absorbed slack is generally directly related to the productivity and capability, and has the potential to lead organisational inertia for its embedded in organisational processes and structures. Organisational inertia can hinder necessary change and innovation and limit the long-term growth. In addition, absorbed slack may be over-invested and stored. The more absorbed slack the organisation has, the more risk-averse it will be. Excessive security inventory level makes organisations reluctant to easily abandon existing business models, which prevents them from exploring new markets and innovation opportunities, thereby limiting their growth (Lauridan & Demil, 2022; Zhao et al., 2024). In a competitive market, absorbed slack can cause an organisation to react less quickly to market changes and miss out on long-term growth opportunities. Accordingly, we propose the following hypotheses:

H1a: Unabsorbed slack is negatively related to organisational growth. Higher levels of unabsorbed slack are adverse to organisational growth.

H1b: Absorbed slack is negatively correlated with organisational growth. Higher levels of absorbed slack are adverse to organisational growth.

2.2 The moderating effect of decision-making ability

In general, organisational slack in a firm is a resource whose stock and use are subject to managerial regulation (Francis et al., 2022). The Upper Echelons theory suggests that, as the ultimate decision-makers in business operations, the differences in personal characteristics such as personality, educational background, cognitive level and values, as well as the different ways of dealing with problems, will lead to different strategic decisions made by different managers in the facing the same problem (Alessandri, Cerrato, & Depperu, 2014; Azadegan, Patel, & Parida, 2013; Demerjian et al., 2013). This ability varies from person to person, leading to different strategic choices and program implementation, which in turn affects the operation and long-term development of the firm (Anderson & Eshima, 2013; Andreou et al., 2015; Azadegan et al., 2013).

Managers who make decisions are finite-rational, so the ways in which organisational slack is used are very closely related to management decisions. Managers in the organisation decide how to allocate resources. Higher decision-making ability indicates that managers can leverage a firm's resources and rely on organisational slack to seize external opportunities. High-capacity managers adapt to environmental changes by adjusting the firm's internal and external resources and create business value by restructuring the firm's resource allocation and investment strategy to realise the firm's long-term development goals (Francis et al., 2022; Wang et al., 2016)

Organisational slack can act as a buffer to help a business weather external shocks through the properties it possesses. In this process, managers should realise efficient decision-making through the effective allocation of resources, etc., and especially in the dynamic changing environment, managers need to seize the opportunity to effectively use the unabsorbed slack with high flexibility to avoid the firm falling into a crisis (Tangpong, Abebe & Li, 2015; Fredrich, Bouncken, & Kraus, 2019). Unlike managers with low self-control, managers with a higher level of decision-making are able to obtain more comprehensive information to effectively predict the development status of the firm to reduce the dependence on liquidity (Vanacker et al., 2017). Therefore,

higher decision-making ability can improve the allocation and use efficiency of internal and external resources, and with a lower level of unabsorbed slack can accomplish the goal of long-term corporate growth.

On the other hand, the better the manager's decision-making ability in the use of idle inventory, machinery and special talents, the better the utilisation of the firm's absorbed slack and the mitigation of the risk shock to the firm in the case of a crisis event (Vanacker et al., 2017; Fredrich et al., 2019; Khurram et al., 2024). Typically, since absorbed slack is directly related to the productivity and capacity of the firm, managers with strong decision-making abilities are able to keenly perceive the signals of opportunities arising from external market and policy trends (Holcomb, Holmes Jr. & Connelly, 2009; Xu et al., 2015; Zhang et al., 2020; Agusti-Perez et al., 2020; Zhang, Xu & Ma, 2023), and thus rebalance the usage of absorbed slack within the organisation. Through the reconfiguration of idle resources inside the organisation, managers are constantly searching for optimal solutions for the utilisation of resources and improving the underutilisation of absorbed slacks in the firm (Suzuki, 2018). Accordingly, we propose:

H2a: Decision-making ability negatively moderates the relationship between unabsorbed slack and organisational growth. The stronger the decision-making ability, the more significant the weakening effect on the negative correlation between them.

H2b: Decision-making ability negatively moderates the relationship between absorbed slack and organisational growth. The stronger the decision-making ability, the more significant the weakening effect on the negative correlation between them.

2.3 The moderating effect of digital transformation

In the digital economy, digital transformation is an important concept that involves an organisation's internal and external aspects. Digital technology has been continuously applied to the production and operation of firms, combining it with internal resources to cultivate a digital-age firm capability. Although digital transformation has long been present in organisations, it is only in recent years that the concept of it has been formalised (Zoppelletto et al., 2023). Digital transformation in organisations mainly uses digital technologies such as automation, blockchain, and cloud computing to optimise business processes within the firm, streamline production steps, and bring new growth opportunities to the firm (Vial, 2019; Zhang, Su & Tong, 2023). Digital transformation is not just a change in the technical aspects of the organisation but also involves changes outside the scope of the organisation, which leads to profound changes in the organisation's products and operations, processes and business models, etc. (Feliciano-Cestero et al., 2023).

Digital transformation can drive companies to improve their resource management capabilities to reduce underutilisation of unabsorbed slack. Starting from resource dependence theory, research on digital transformation has mostly focused on the firm dimension, including corporate governance, economic value, and firm performance (Ji et al., 2022; Meng, Su & Yu, 2022; Wang & Du, 2022). It has been found that the deeper the degree of digital transformation, the higher the firm's ability and efficiency in managing resources. Unabsorbed slack generally represents waste caused by companies not using their resources effectively. In contrast, digital transformation can help companies manage and utilise their existing resources more efficiently, thereby reducing the need for corporate cash flow. Second, digital transformation also provides companies with more opportunities for organisational innovation (AlNuaimi et al., 2022; Gao et al., 2022; Guo & Xu, 2021; Li et al., 2018), allowing them to optimise internal information flow, strengthen data analytics, and improve decision-making accuracy through in-depth digital transformation to reduce unabsorbed slack inventory (Li et al., 2018). This ability to learn and innovate helps firms make better use of their existing resources, which also dampens the impact of unabsorbed slack on organisational growth (Wang, Guo & Yin, 2017).

Digital transformation enables the integration of digital technologies with absorbed slack to improve the productivity of manufacturing operations. From the concept of digital transformation, it is clear that in a firm, digital transformation is not simply about applying technology but also about changing the organisation's structure and business processes (Feliciano-Cestero et al., 2023; Vial, 2019). The use of digital technologies in business systems has enabled the faster inter-organisational transfer of information on organisational redundancies, helping managers keep track of the use and effectiveness of resources in real-time and to make timely adjustments to programs (Ferreira et al., 2019). This transfer allows the organisation to understand the

external demands and internal needs of the firm, enabling it to respond more quickly to changes in the marketplace and gain a strategic advantage in the long term. In addition, in the process of digital transformation, digital technologies have driven innovation in firm business models and core products (Li et al., 2017; Li et al., 2018). The deeper the digital transformation, the more the stock that has absorbed slack will contribute to the growth of the organisation. Accordingly, we propose the following hypotheses:

H3a: Digital transformation negatively moderates the relationship between unabsorbed slack and organisational growth. The deeper the digital transformation, the more pronounced is the weakening effect on the negative correlation between them.

H3b: Digital transformation negatively moderates the relationship between absorbed slack and organisational growth. The deeper the digital transformation, the more pronounced the weakening effect on the negative correlation between them.

Combined with our hypotheses, the figure below (**Error! Reference source not found.**) explains our conceptual framework.

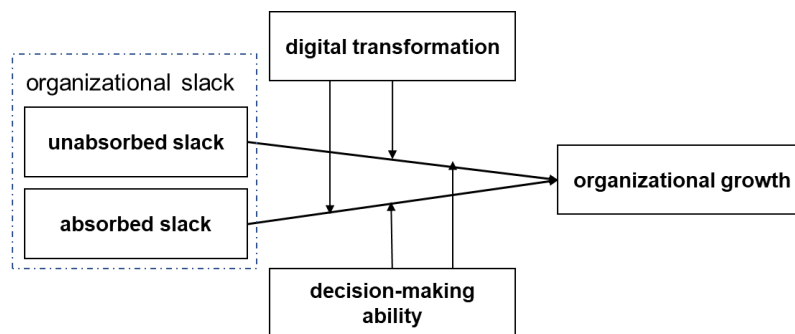


Figure 1. Conceptual Framework

3. Methodology

3.1 Sample and data

We selected all A-shares listed companies in China from 2011 to 2019 as a sample. The CSMAR databases are used to calculate main variables and control variables that represent firm and individual characteristics. Considering the deviation value, we delete data from the financial and real estate sectors and remove the sample with ST and ST* marks from 2011 to 2019. We also expurgate samples with missing variables for three or more consecutive years. Supplementing some missing data through the Internet and official corporate financial reports, we finally get 14049 annual observations of companies from 2011 to 2019. The final data sample after processing is an unbalanced panel data.

The core variable, organisational growth, is a long-term indicator. China experienced the COVID-19 outbreak in late 2019 and early 2020, and the COVID-19 outbreak that began in 2020 has had an unprecedented impact on the global economy and organisation operations. Such extreme event has led to abnormal data in the data which makes the data of the year from 2020 to 2023 incomparable to previous years, affecting the accuracy and reliability of the results. Also, this significant economic fluctuation masks the long-term impact of slack resources on companies' growth, and there are more outliers in the newer data, making the data for this period unsuitable for analysing stable trends in organisational growth. Therefore, we have used the data from 2011 to 2019 to conduct this research.

3.2 Variables and measurements

(1) Dependent variable: Organisational growth

Referring to previous studies, we regard three years as the time window for organisational growth (Ortiz-de-Mandojana & Bansal, 2016). We calculate the growth of the cumulative operating income of the firm within three years as our dependent variable (the data are collected from "Financial data database" of CSMAR). It is

worth noting that we choose cumulative growth rather than year-to-year growth to represent organisational growth. One important reason is that year-on-year growth does not reflect the longer-term performance of the organisation, but cumulative growth reflects the organisation's long-term growth.

(2) Independent variables

We divide organisational slack into unabsorbed slack and absorbed slack (Bourgeois & Singh, 1983). Referencing to Bourgeois et al. (1981) and Duan et al. (2020), we calculate our independent variables. Unabsorbed slack is calculated using financial metrics, measured as the average of current ratio and the debt equity ratio (the data are collected from "Financial data database" of CSMAR). It reflects the company's ability to repay debts and invest. Absorbed slack is measured by financial expense rate during the sales period, reflecting organisational slack that can be reused in the absorbed slack.

(3) Moderators

Decision-making ability. Although there are various methods to measure managerial decision-making ability, Dermerjian et al. (2013) approach is widely used. The data envelopment analysis (DEA) method and Tobit model are used to calculate the decision-making ability, which is divided into two steps (Dermerjian et al., 2013). This DEA method calculates manager capability by separating the impact of managers on the efficiency of the firm from the total efficiency of the firm. On the basis of avoiding missing samples, this method can simply and intuitively calculate the operating efficiency of large sample companies, and has obtained a large amount of contributions in the previous studies (Agustí, Velasco & Galán, 2021; Andreou et al., 2015; Francis et al., 2022; Holcomb et al., 2009). The DEA method is divided into two steps: first, calculate the total efficiency of the company by industry; Next, the contribution value of the separate manager. Since firm efficiency is affected by factors at both firm and manager levels, Tobit model is used to separate the effects of the two. And we assign the results of values to the residuals in order of magnitude, with a maximum value of 4 and a minimum value of 1.

Digital transformation. Traditional firm-level research on digital transformation uses questionnaires for measurement. However, this measurement method has common methodological bias and subjective bias, resulting in problems of reliability and validity (Vial, 2019). The text mining method, using multi-source heterogeneous data and machine learning algorithms, can effectively reduce theses bias. In the current research, the computational digital transformation mainly adopts the approach of text mining (Ji et al., 2022; Matarazzo et al., 2021; Tian, Li & Cheng, 2022). The CSMAR database "Digital economy database" contains the indicators of digital transformation of Chinese listed company and the database are widely used because of its authority. Digital transformation is measured by counting the frequency of keywords in a firm's annual report, such as terms relate to digitalisation like artificial intelligence, blockchain, big data, Internet, etc. The statistical word frequency is the sample value of digital transformation.

(4) Control variables

We also control for variables that may affect organisational slack and organisational growth. We mainly consider the influence of firm factors on the study, such as firm size and firm age. We took the logarithm of firm size. For controlling executive characteristics, we use executive team size as a control variable, which is defined as the total number of executives. Besides, the degree of aggressiveness and depth of R&D activities varies from firm to firm. Therefore, we used the R&D investment intensity variable as a control variable. R&D investment intensity is the ratio of R&D investment expense to firm's operating income, indicating the importance of technological innovation such as digitisation. All the data are collected from "Equity and governance database" and "Listed company R&D innovation database" (CSMAR).

3.3 Estimation method

We use a two-factor fixed effects regression model to test our hypotheses. And we take natural logarithms for part of our variables in order to reduce multicollinearity before the regression.

First, we test the main effect of organisational slack on organisational growth, as shown in equation (1).

$$OG = \frac{\beta_1 POTENTIAL_{i,t}}{SALES_{i,t}} + \sum Controls + \delta_i + \lambda_t + \varepsilon_{i,t} \quad (1)$$

Then we test the moderating effects of digital transformation and decision-making ability, as shown in equation (2) and (3),

$$OG = \frac{\alpha_1 POTENTIAL_{i,t}}{SALES_{i,t}} + \frac{\alpha_2 MA_{i,t}}{DIGI_{i,t}} + \sum Controls + \delta_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

$$OG = \frac{\alpha_1 POTENTIAL_{i,t}}{SALES_{i,t}} + \frac{\alpha_2 MA_{i,t}}{DIGI_{i,t}} + \frac{\alpha_3 POTENTIAL_{i,t} \times MA_{i,t}}{DIGI_{i,t}} + \sum Controls + \delta_i + \lambda_t + \varepsilon_{i,t} \quad (3)$$

where $POTENTIAL_{i,t}/SALES_{i,t}$ indicates unabsorbed slack/absorbed slack; $MA_{i,t}/DIGI_{i,t}$ represents decision-making ability/digital transformation; OG denotes the independent variable; $\sum Controls$ are sets of control variables; δ_i denotes fixed individual effect aim to control for factors that do not vary over time but are related to individual; λ_t indicates fixed time effect, controlling for correlational variables that vary over time but not with individuals; we let $\varepsilon_{i,t}$ on behalf of random error to ensure the reliability of evidence. Table 1 lists all the variables and their abbreviation.

Table 1. Variable description

	Variable Name	Abbreviation
Dependent variable	Organisational growth	OG
Independent variable	Unabsorbed slack	POTENTIAL
	Absorbed slack	SALES
Moderating variable	Digital transformation	DIGI
	Decision-making ability	MA
Control variable	Firm characteristics: Firm age	AGE
	Firm characteristics: Firm size	LNSIZE
	R&D activities: R&D investment intensity	RD
	Executive characteristics: Team size	TMT

4. Results and discussion

4.1 Hypothesis tests

Table 2 displays the sample characteristics and the correlations for the variables, indicating that there is no multicollinearity between the remaining variables.

Model 1 in Table 3 tests the effect of unabsorbed slack on organisational growth, and shows that unabsorbed slack has a negative effect on organisational growth ($B=-2.067$; $p < 0.01$). Model 6 in Table 4 tests the effect of absorbed slack on organisational growth, and indicates that absorbed slack has a negative effect on organisational growth ($B=-233.958$; $p < 0.001$). Thus, both H1a and H1b are supported.

Table 2. Descriptive Statistics and Correlations

	Mean	SD	Min	Max	OG	POTENTIAL L	SALES	DIGI	MA	AGE	LNSIZE	RD	TM T
OG	23.75	86.10	-184.5	567.6	1								
POTENTIAL	1.226	1.157	0.242	8.026	0.1217***	1							
SALES	0.0179	0.0365	-0.0606	0.215	-0.0221	-0.3362***	1						
DIGI	1.129	1.311	0	4.812	0.0787***	0.0287**	0.1440***	1					
MA	2.437	1.136	1	4	0.0259*	-0.0342***	0.0885***	0.0429***	1				
AGE	17.26	5.630	1	43	0.0417***	-0.1726***	0.1394***	0.0756***	0.1000***	1			
LNSIZE	3.105	0.0590	2.704	3.355	0.4760***	-0.2792***	0.1966***	0.0849***	0.0159	0.1482***	1		
RD	3.903	4.120	0.0101	25.03	0.1321***	0.2775***	0.1685***	0.3358***	0.2443***	-0.1434***	0.2232***	1	
TMT	16.98	3.698	10	29	0.1792***	-0.1652***	0.1273***	0.0582***	-0.0211	0.0298**	0.4208***	0.0787***	1

* T-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

“Decision-making ability” is introduced in Model 3 and Model 8 to test H2a and H2b. Model 3 in Table 3 illustrates that there exists a substitution effect between decision-making ability and unabsorbed slack, supporting H2a ($B=-1.403$; $p<0.01$). The stronger the decision-making ability, the greater the weakening effect on the negative relationship between unabsorbed slack and organisational growth. In Model 6, we have tested H2b. The interaction coefficient also provides evidence supporting this hypothesis ($B=-40.329$; $p<0.1$). The stronger the decision-making ability, the greater the weakening effect on the negative relationship between absorbed slack and organisational growth. Thus, both H2a and H2b are supported.

"Digital transformation" is introduced in Model 5 and Model 10 to test H3a and H3b. Digital transformation has a significantly positive effect on the relationship between unabsorbed slack and organisational growth ($B=1.303$; $p<0.01$), as presented in Model 5 in Table 3. Digital transformation exhibits a substitution effect with unabsorbed slack.. But Digital transformation has an insignificantly negative effect on that between unabsorbed slack and organisational growth ($p>0.1$), as shown in Model 10 in Table 4. The possible reason is that digital transformation has limitations across enterprises, industries and regions. Large enterprises or technology-intensive enterprises are advancing in digital transformation faster than small and medium-sized enterprises (SMEs), leading to an imbalance in the degree of digital transformation among businesses. Furthermore, there are differences in the effectiveness of digital technology utilisation among different enterprises. Some enterprises face difficulties in technology integration and fail to achieve effective integration of technology with unabsorbed redundancy, which limits the enhancement of resource management capabilities through digital transformation. Thus, H3a is supported, but H3b is not supported.

Table 3. Regression results: Unabsorbed slack and organisational growth

	M1	M2	M3	M4	M5
VARIABLES	OG	OG	OG (with MA)	OG	OG (with DIGI)
POTENTIAL	-1.309e+08**	-8.876e+07	-2.111e+08*	-1.375e+08**	-1.470e+08**
	(-2.42)	(-1.54)	(-1.90)	(-2.53)	(-2.28)
MA		-5.645e+08***	-6.298e+08***		
		(-8.21)	(-7.38)		
POTENTIAL×MA			49846853.675		
			(1.29)		
DIGI				-1.544e+08**	-1.651e+08**
				(-2.47)	(-2.24)
POTENTIAL×DIGI					8681636.310
					(0.27)
AGE	76411472.282***	85144362.123***	84200012.129***	93424005.338***	93398235.489***
	(3.10)	(3.27)	(3.23)	(3.65)	(3.65)
LNSIZE	-7.523e+10***	-7.824e+10***	-7.820e+10***	-7.430e+10***	-7.428e+10***
	(-31.82)	(-31.58)	(-31.56)	(-31.04)	(-31.00)
TMT	-9.982e+07***	-1.005e+08***	-1.006e+08***	-9.807e+07***	-9.815e+07***
	(-4.19)	(-4.06)	(-4.07)	(-4.11)	(-4.12)
RD	51130438.036***	33720637.827**	34871513.127**	52020604.140***	51610357.192***
	(3.85)	(2.39)	(2.47)	(3.92)	(3.86)
Constant	2.312e+11***	2.418e+11***	2.418e+11***	2.282e+11***	2.281e+11***
	(32.64)	(32.53)	(32.54)	(31.75)	(31.72)
Observations	12,593	12,080	12,080	12,593	12,593
R-squared	0.135	0.142	0.144	0.135	0.137
Number of id	1,547	1,523	1,523	1,547	1,547
Company FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

* T-statistics in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4. Regression results: Absorbed slack and organisational growth

	M6	M7	M8	M9	M10
VARIABLES	OG	OG	OG (with MA)	OG	OG (with DIGI)
SALES	6.522e+09*** (5.14)	6.289e+09*** (4.77)	-2.341e+09 (-1.12)	6.490e+09*** (5.12)	3.182e+09** (2.18)
MA		-5.471e+08*** (-7.96)	-8.368e+08*** (-9.55)		
SALES×MA			3.404e+09*** (5.31)		
DIGI				-1.432e+08** (-2.29)	-3.390e+08*** (-4.47)
SALES×DIGI					2.500e+09*** (4.53)
AGE	70577365.884*** (2.87)	76185150.583*** (2.93)	80634019.472*** (3.10)	86729855.313*** (3.39)	90853055.237*** (3.55)
LNSIZE	-7.396e+10*** (-31.44)	-7.725e+10*** (-31.31)	-7.804e+10*** (-31.61)	-7.307e+10*** (-30.66)	-7.313e+10*** (-30.71)
TMT	-1.004e+08*** (-4.21)	-1.013e+08*** (-4.10)	-1.000e+08*** (-4.05)	-9.868e+07*** (-4.14)	-1.013e+08*** (-4.25)
RD	35619759.964*** (2.65)	20294403.882 (1.43)	24249960.779* (1.71)	36376191.330*** (2.70)	34671083.973*** (2.58)
Constant	2.268e+11*** (32.24)	2.383e+11*** (32.25)	2.414e+11*** (32.61)	2.239e+11*** (31.34)	2.243e+11*** (31.42)
Observations	12,593	12,080	12,080	12,593	12,593
R-squared	0.135	0.142	0.144	0.135	0.137
Number of id	1,547	1,523	1,523	1,547	1,547
Company FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

* *T*-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.2 Robustness and endogeneity check

Replacing independent variables. The above empirical study found that redundant resources have a significant effect on organisational growth, but the research results may be affected by endogeneity issues. Although a series of organisation-related variables have been controlled in our model, there may still be endogeneity issues. In response to the potential problems, we used industry-level adjusted financial indicators as instrumental variables to eliminate differences between industries. Therefore, we measured unabsorbed slack by using the quick ratio of enterprises minus the industry median or mean (QR), and absorbed slack by using the ratio of sales and administrative expenses (SALESRATE) to operating income minus the industry median or mean (Table 5).

Table 5. Replacing independent variables

VARIABLES	(1) QR	(2) SALESRATE	(3) QR	(4) SALESRATE
QR	-1.100*** (-4.96)		-0.405* (-1.79)	
SALESRATE		-139.967*** (-6.70)		-81.233*** (-3.68)
AGE			-1.775*** (-4.90)	-1.584*** (-4.38)
LNSIZE			1,029.479*** (29.14)	1,023.645*** (28.96)
TMT			1.319*** (3.69)	1.327*** (3.72)
RD			-1.756*** (-5.30)	-1.550*** (-4.60)
Constant	19.298*** (11.26)	25.168*** (12.15)	-3,150.441*** (-29.81)	-3,131.697*** (-29.61)
Observations	14,040	14,036	11,918	11,918
R-squared	0.032	0.033	0.114	0.115
Number of id	1,618	1,618	1,502	1,502
Company FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

* *T*-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Lagging dependent variable. When conducting robustness tests, we introduced the dependent variable lagged by one period (F. Growth). The theoretical basis for this approach is that strategic decisions and organisational growth of enterprises often require a certain amount of time to be implemented and to manifest their effects. Therefore, we believe that lagging the dependent variable by one period can more accurately capture the long-term impact of corporate decisions. In Table 6 columns (1) to (2), the impact of unabsorbed slack and absorbed slack on organisational growth lagged by one period is reported, showing that both unabsorbed and absorbed slack have a negative effect on organisational growth, thus validating the robustness of the results.

Adding control variables. To further control other factors that may affect corporate performance, we included the Book-to-Market Ratio (MBA) and Debt-to-Asset Ratio (DEBTASSET) as control variables in the model. The Book-to-Market Ratio can reflect the financial structure and investment value of an enterprise, while the Debt-to-Asset Ratio can reveal the financial leverage level of an enterprise. The inclusion of these two variables helps us to more comprehensively understand the factors affecting corporate performance. In Table 6 columns (3) to (4), the regression results with added control variables are reported, showing that both unabsorbed slack and absorbed slack have a negative effect on organisational growth, thus validating the robustness of the results.

Controlling for industry fixed effect. In the main effect regression model, we considered the dual fixed effects of time and individuals but did not fully account for the heterogeneity between industries. To address this issue, we introduced industry fixed effects (Industry FE) in the robustness test. By controlling for industry effects, we can more accurately assess the impact of corporate organisational growth on performance and eliminate the interference that industry-specific factors may bring. In Table 6 columns (5) to (6), the regression results with added control variables are reported, showing that both unabsorbed slack and absorbed slack have a negative effect on organisational growth, thus validating the robustness of the results

Table 6. Lagging dependent variable, adding control variables and controlling for industry fixed effects

VARIABLES	(1) F. Growth	(2) F. Growth	(3) Add Control	(4) Add Control	(5) Growth Industry	(6) Growth Industry
POTENTIAL	-1.790** (-2.07)		-1.572* (-1.83)		-7.280*** (-11.36)	
SALES		-175.136*** (-4.92)		-308.681*** (-9.12)		-86.210*** (-3.59)
AGE	-0.634 (-1.46)	-0.455 (-1.06)	-1.793*** (-4.98)	-1.505*** (-4.23)		
LNSIZE	625.752*** (15.20)	655.967*** (15.93)	1,208.385*** (31.93)	1,194.615*** (31.66)		
TMT	0.019 (0.05)	-0.031 (-0.08)	1.082*** (3.06)	1.000*** (2.84)		
RD	-1.084***	-1.094*** (-2.84)	-1.668*** (-5.08)	-1.378*** (-4.20)		
DEBTASSET			3.142 (0.48)	39.816*** (5.76)		
MBA			-76.666*** (-15.21)	-74.641*** (-14.86)		
Constant	-1,893.231*** (-15.37)	- 1,989.200*** (-16.18)	-3,653.506*** (-32.55)	- 3,630.352*** (-32.48)	7.594** (2.32)	-3.434 (-1.22)
Observations	10,202	10,202	11,918	11,918	14,040	14,036
R-squared	0.063	0.065	0.134	0.141	0.064	0.056
Number of id	1,478	1,478	1,502	1,502	Cluster	Cluster
Company FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	NO	NO	NO	NO	YES	YES

* T-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Changing the sample period. To assess the robustness of the results of this study, we drop the years of the sample for robustness checks. The reason is that Industry 4.0 officially started in 2013, and countries have begun to advocate the application of digital technologies to all walks of life. China proposed the concept of digital transformation in recent years and that firms define their digital transformation. Therefore, we delete a time

window (3 years from 2011 to 2013) of years and reperformed the two-factors fixed effects regression. As presented in Table 7, H1a, H1b have still be supported.

Table 7. Changing the sample period

VARIABLES	(1) Growth	(2) Growth	(3) Growth	(4) Growth
POTENTIAL	-4.456*** (-3.66)		-0.191 (-0.13)	
SALES		-252.360*** (-7.64)		-365.365*** (-8.63)
AGE			2.020*** (3.78)	1.962*** (3.69)
LNSIZE			1,298.739*** (24.00)	1,272.868*** (23.62)
TMT			1.121** (2.39)	1.073** (2.30)
RD			-2.499*** (-5.90)	-1.909*** (-4.48)
DEBTASSET			-26.388*** (-2.97)	9.371 (1.02)
MBA			-76.872*** (-11.47)	-73.411*** (-10.99)
Constant	21.349*** (10.15)	21.086*** (12.70)	-4,000.366*** (-24.62)	-3,932.017*** (-24.33)
Observations	9,313	9,312	8,095	8,095
R-squared	0.050	0.056	0.136	0.145
Number of id	1,603	1,603	1,488	1,488
Company FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	NO	NO	NO	NO

* *T*-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5. Case study

In this part, we conducted a one-case study, that is, using multiple methods to test the robustness of our findings. More specifically, we interviewed the senior managers of Company H, a coal mine enterprise which is a traditional enterprise from China. They are exploring the digital transformation of traditional enterprises.

5.1 Company profile

Company H is a subsidiary of a central enterprise. As of the end of 2023, there are 682 employees and its revenue exceeds 190 million *yuan*, which belongs to the standard of small and medium-sized coal mine enterprises. In the era of digital economy, Company H, as a traditional coal mine enterprise, realises the importance of digitalisation for organisational resource utilisation and organisational growth. At the end of 2023, relying on the cloud platform, the construction of the "Sunshine Project" was launched, in order to speed up the transformation and upgrading of one's own business, rationally utilise the internal resources of the organisation, and finally improve the company's operating efficiency then accomplish their organisational growth.

"Sunshine Project" is a digital decision-making system co-developed by Company H and *MingdaoCloud*. The system embeds various processes involved in daily management, simultaneously establishing a cross-departmental collaboration mechanism. It integrates data resources scattered in different departments and business lines, achieving centralised management and analysis of data. By July 2024, the construction of the "Sunshine Project" system involves 18 business applications, 522 work forms, and 777 workflows.

5.2 Case analysis

We conducted in-depth interviews with the main persons in charge of eight key departments of Company H, including the planning and operation department, financial operation department, comprehensive management department, human resources department, supervision department, material processing center, production technology department and the "Sunshine Project" digital management decision-making system construction team. "Sunshine Project" has been used in all links, realising real-time monitoring of resources and multi-

department approval circulation. Consistent with our empirical findings, respondents said that digital transformation is critical for enterprises to use organisational redundancy to respond to market changes and improve competitiveness. Besides, in the actual operation of Company H, digital transformation has penetrated into every link of operations. Managers pointed out that companies are facing dual pressures from technological updates and market competition, which facilitates the implementation of digital transformation practices. In particular, Company H has strengthened the informatisation and digitisation of internal management by implementing the “Sunshine Project”. This strategic move has played a key role in promoting digital transformation practices. Managers emphasised that data governance and cross-departmental collaboration consolidate fragmented data resources and identify organisational slacks in the process of digital transformation. Thereby they have improved the efficiency of decision-making and the ability to respond to market changes. Factors such as internal management improvement, data governance, cross-department collaboration are classified as an enhancement of internal management capabilities in our empirical research. All the managers indicated that these factors have a positive impact on the implementation of digital transformation. Managers shared their experiences on how to incorporate digital transformation into daily management, and optimise business processes, which are considered critical to developing the relationship between digital transformation practices and company performance. In addition, managers also shared how they can improve the utilisation efficiency of absorbed slack through internal improvements, such as optimising management processes and upgrading employee skills, which is consistent with the positive effects of absorbed slack on organisational growth in our empirical research.

However, the case of Company H also reveals the challenges that unabsorbed slack can pose. As the empirical study shows, unabsorbed slack may hinder the growth of an organisation if it is not effectively managed and utilised. In the interviews, managers mentioned that the lack of information technology foundations and cross-departmental collaboration mechanisms causes waste and inefficiency when digital transformation starts. Data silo and disjointed processes weaken the company's competitiveness and growth potential, and the negative impact of unabsorbed slack has been thoroughly reflected. However, “Sunshine Project” has been continuously promoted, and Company H successfully improved its internal management capabilities. Therefore, Company H has enhanced its internal collaboration and optimised its resource allocation, transforming the unabsorbed slack into a force for organisational growth. Gradually, Company H overcame these obstacles to achieve the effective use of resources and continuous growth.

6. Conclusions

6.1. Interpretation of main findings

In the context of digitisation, it is necessary to delve into the significance of organisational slack for organisational growth as an important resource for companies when it comes to operational management. We focus on the relationship between organisational slack and organisational growth, as well as how two factors management decision-making capability and digital transformation, affect this relationship. We find that both unabsorbed and absorbed slacks have a negative effect on organisational growth. Decision-making ability play a negative moderating role between organisational slack and organisational growth, suggesting that stronger decision-making ability can enhance the positive impact of slacks on growth. Similarly, we find that digital transformation negatively moderates between unabsorbed organisational slack and organisational growth.

6.2. Theoretical contributions

Based on our findings, this study has three main theoretical contributions. First, we classify organisational slack, starting from unabsorbed and absorbed, and explore the differential impact of different organisational slacks on organisational growth. Although there are studies that discuss the economic consequences of different organisational slack, they are just categorised from a functional perspective, such as financial slack, operational slack (Azadegan et al., 2013). This study reveals that the long-term growth of organisations differs in the need for different organisational slacks, which facilitates a more comprehensive academic evaluation of the value of organisational slack in organisations and provides empirical support for the economic effects and strategic implications of different organisational slacks on organisations.

Second, our study extends the influences related to organisational growth, which is beneficial for firms to develop their own long-term resilience capabilities. Organisational growth, as a long-term strategic goal of a company, requires a company to take a long-term view and not be short-sighted in exploiting and arranging slacks within the organisation. In the short term, organisational resilience is the ability of an organisation to recover from shocks in an uncertain environment; in the long term, it is the ability to help a business continue to survive and thrive. Thus, using organisational slack as a baseline, this study enriches the research context of organisational slack on organisational growth, thereby expanding the ways in which resources can be used to develop resilience competencies.

Third, broadly speaking, this study provides empirical support for the further development of Resource Dependence Theory and Upper Echelons Theory by validating the applicability of these theories in the context of the digital economy. In organisations, digital technology is introduced as an external technological resource to achieve the digital transformation of the organisation by integrating it with slack resources within the organisation; and managers, as the decision makers who coordinate the strategic behaviors of the organisation, have a decisive role in the allocation of resources. Through empirical analysis, we have enriched the applied research on Resource Dependence Theory and Upper Echelons Theory in the area of digital transformation and management decision-making capabilities affecting organisational slack and organisational growth, and provided new perspectives for theoretical research.

6.3. Managerial implications

This study has important implications for management practices in companies. First, the rational use of organisational slack facilitates the implementation of strategic goals and can help companies thrive. Organisational slack is the accumulation of resources beyond the daily operational needs of a firm over a certain period of time; therefore, it can be used as a buffer in unexpected situations to help the firm tide over a crisis. Firms can utilise funds from unabsorbed slack in the short term to respond flexibly to changes in market demand, and in the long term, they can utilise talent pools and R&D budgets from absorbed slack to promote innovation. Through the targeted use of organisational slack, companies are able to cope with external and internal uncertainties, improve organisational responsiveness to the changes, and ensure sustainable growth.

Second, in the background of the digital economy, firms need to pay attention to the positive effects of digital transformation practices on resource utilisation and management decisions. The results of this study suggest that digital transformation can contribute to the positive effect that absorbed slack has on organisational growth. As a result, companies can use big data and analytics tools to fine-tune organisational slack, while market trends can also be analysed through a range of data technologies, which digital tools can help managers collect information to make more accurate predictions and improve the speed of information transfer. Firms need to take into account their own reality and gradually carry out their own digital transformation to improve their competitiveness in the digital economy, so as to realise their long-term growth goals.

6.4. Limitation and future research

However, our study also has a set of limitations like others. First, due to the lack of individual industry samples, we have only considered industry-wide data samples under the context of digitisation and have not examined a particular industry in more detail. Therefore, future researchers can continue to collect large samples of different companies in the same industry and extend the study horizontally to organisational slack practices in individual industries.

Second, we tried to explore the impact of organisational slack on organisational growth, and this study also discussed the classification of organisational slack, which was not comprehensive enough. At the same time, some of the scholars in the existing research articles on organisational slack affecting the economic consequences of organisations found a non-linear effect of action (Anderson & Eshima, 2013; Duan et al., 2020; Fredrich et al., 2019), which we did not consider further. Therefore, future researchers can continue to explore the mechanism of the impact of different types of organisational slack on organisational development, and horizontally expand the research content of organisational slack; then, researchers can also explore the possibility of whether there is a non-linear relationship between organisational slack on organisational growth, and further in-depth discussion of the mechanism of the role of redundancy between the two.

Finally, though we have analysed the factors affecting organisational slack and organisational growth from the internal and external perspectives of management decision-making ability and digital transformation, we haven't considered other internal and external factors that could have significant impact on the relationship between organisational slack and organisational growth. In the era of digital economy, people are more aware of environmental protection and pay more attention to the public welfare behavior of companies. The use of green technologies and corporate social responsibility (CSR) may also affect the allocation of slack resources in organisations (Ji et al., 2022; Khurram et al., 2024). We also have not discussed other external factors that are more macro, such as macroeconomic factors, industry characteristics, and market dynamics (Boso et al., 2017; Kuusela, Keil, & Maula, 2017; Leuridan & Demil, 2022; Tognazzo, Gubitta, & Favaron, 2016). Changes in the economic cycle can affect companies' investment decisions and resource allocation (Khurram et al., 2024), thus could affect companies' growth. The maturity and competitive intensity of the industry may also lead to differences in the efficiency of resource utilisation, influencing organisational growth (Agustí et al., 2021; Hong & Shin, 2021). These limitations have restricted the general applicability of our findings. Therefore, future researchers may consider including these factors to provide a more comprehensive analysis.

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