Factors Influencing the Effectiveness of High-Tech SMES in Henan Province

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Abstract:- The purpose of this study were: (1) To study a causal model of factors influencing leadership in the digital age affecting the performance of high-tech SMEs in Henan Province. (2) To analyze the factors influencing leadership in the digital age affecting the performance of high-tech SMEs in Henan Province.(3) To identify effective strategy to improve the efficiency of high-tech SMEs in Henan Province. This study adopts a mixed research method combining quantitative and qualitative research. The quantitative research uses Hair's sample size calculation method to obtain a total of 340 samples, The regional scope of this study is Nanyang City, Henan Province. The qualitative research method was in-depth interviews, with the main subjects being 8 managers or human resource management managers of small and medium-sized high-tech enterprises in Nanyang City, Henan Province.

Major findings: In the relationship between leadership and SMEs effectiveness in the digital era, our study shows that leadership enhancement directly affects the technological innovation, talent and skills, financial resources, and market environment of the organization. Specifically, the strong relationship between leadership factors and incentives in the digital era stimulates employees' intrinsic motivation, resulting in a significant increase in both innovation and effectiveness indicators. Regarding job satisfaction, we find that motivational factors such as reward incentive system, favorable working environment and career development opportunities are closely related to employee satisfaction. Corporate culture and coworker relationships also play a key role in job satisfaction and have a positive impact on enhancing employees' overall happiness and satisfaction. The index values for level of consistency the structural equation simulation model appropriate and harmonious empirical data Chi-square=103.232 df.=72 CMIN/df.=2.81 n=214 CFI=0.990 NFI=0.931 GFI=0.932 IFI=0.988 RMSEA=0.049 SRMR = 0.043 Through in-depth data analysis, this study provides clear guidance and suggestions for the implementation of leadership development programs for high-tech SMEs in Nanyang City, and provides strong support for enterprises to improve their innovation ability, talent attractiveness, and employee satisfaction.

Keywords:- Henan Province, The Effectiveness, The Relationship.

I. INTRODUCTION

With the rapid development of science and technology and economic globalization, high-tech small and medium-sized enterprises (SMEs) as the main body of innovation and an important force of economic growth, have attracted more and more attention from governments and societies. High-tech enterprises have the characteristics of high technological content, strong innovation ability, and great market potential. They are an important support for promoting industrial structure upgrading, enhancing international competitiveness, and achieving sustainable development. However, high-tech companies also face many challenges, such as lack of funds, brain drain, market risks, intellectual property protection, etc. These factors affect the innovation efficiency and effectiveness of high-tech companies. This is especially true in Henan Province, where the growth of high-tech SMEs is rapidly changing the economic landscape. Leadership in the digital age plays a key role in navigating this complex environment. Effective leadership motivates employees, creating a positive work environment, which can lead to increased employee satisfaction and ultimately, the overall effectiveness of the business. High-tech SMEs refer to small and medium-sized enterprises with high-tech as the core and strong innovation capabilities and market competitiveness. High-tech SMEs enterprises play an important role in promoting economic growth, promoting scientific and technological progress, increasing employment, and cultivating innovative culture. However, high-tech SMEs are also facing many challenges, such as insufficient funds, brain drain, market risk, and management lag. Therefore, how to improve the effectiveness of high-tech SMEs, that is, their ability to achieve the established goals, has become an urgent problem to be solved.

Error! Reference source not found.From a macro perspective, Henan Province, as the most populous province in China, has huge economic potential. The province's economy is dominated by agriculture, but over the past few decades, high-tech industries have emerged in the region. Especially in Nanyang City, a large number of high-tech enterprises have emerged, including enterprises in the fields of biotechnology, new materials, and electronic information. However, compared with other regions, these companies are facing many challenges, including shortage of funds, brain drain, and rapid technological update. From a micro perspective, leaders of high-tech SMEs need to face the challenges of diversity. Leadership in the digital age requires not only traditional decision-making, organization, and control capabilities, but also leaders' ability to understand, use, and promote technology, as well as the ability to stimulate employee innovation and participation. Especially in high-tech companies,

this kind of leadership is critical to the growth and effectiveness of the business.

This paper takes high-tech SMEs in Henan Province as the research object, and uses the structural equation modeling (SEM) method to explore the causal relationship among leadership, motivation, job satisfaction and effectiveness. This paper argues that in the digital age, leadership is an important factor affecting the performance of high-tech SMEs, and it can affect performance through two mediating variables, motivation and job satisfaction. Leadership refers to the ability of leaders to use digital tools and ways of thinking in a digital environment to influence and motivate employees to achieve organizational goals. Motivation means that leaders stimulate employees' intrinsic and extrinsic motivation by setting reasonable goals, providing appropriate rewards, and establishing good communication and feedback mechanisms, so as to improve employees' work engagement and performance. Job satisfaction refers to the overall evaluation and feelings of employees on their job content, environment, conditions, relationships, etc., and it reflects the degree of identification and loyalty of employees to the organization. Effectiveness refers to the ability of high-tech SMEs to achieve their established goals, which can be measured from multiple dimensions such as finance, market, innovation, and society.

Employee motivation and job satisfaction are important mediating variables between leadership and organizational effectiveness. A high level of motivation can drive employees to put in more effort, thereby improving the efficiency and quality of their work. At the same time, high job satisfaction can reduce the turnover rate of employees and improve the stability and continuity of the enterprise. In high-tech SMEs, motivating employees and improving job satisfaction is one of the important responsibilities of leaders.

This paper selects leadership, incentive mechanism, job satisfaction and innovation performance as the main variables, builds a theoretical model, and uses questionnaires and other methods to conduct empirical analysis. Leadership refers to the ability of leaders to lead organizational changes, stimulate employees' potential, and promote organizational innovation in the digital age; incentive mechanism refers to the various material and spiritual measures adopted by the organization to stimulate the enthusiasm and initiative of employees. Incentive measures; job satisfaction refers to employees' satisfaction with their work and its various aspects; innovation performance refers to the economic, social and environmental achievements of high-tech enterprises through innovation activities. This paper assumes that leadership has a direct positive impact on innovation performance, and also indirectly affects innovation performance through two mediator variables, incentive mechanism and job satisfaction. The purpose of this paper is to explore the relationship among leadership, incentive mechanism, job satisfaction and innovation performance of high-tech enterprises in Henan Province, and to provide theoretical basis and policy suggestions for improving the innovation ability and competitive advantage of high-tech enterprises in Henan Province. In summary, understanding and optimizing leadership, employee motivation, and job satisfaction

have important theoretical and practical implications for improving the effectiveness of high-tech SMEs in Henan Province.

➢ *Research Objective*
- To study a causal model of factors influencing leadership in the digital age affecting the performance of high-tech SMEs in Henan Province.
- To analyze the factors influencing leadership in the digital age affecting the performance of high-tech SMEs in Henan Province.
- To identify effective strategy to improve the efficiency of high-tech SMEs in Henan Province.

➢ *Research Hypothesis*
- Hypothesis 1 (H1) Leadership in digital era has an indirect influence on motivation
- Hypothesis 2 (H2) Leadership, employee work motivation, and job satisfaction in the digital age have a direct impact on effectiveness of high-tech SMEs in Henan Province
- Hypothesis3(H3) Leadership in the digital age has an indirect impact on job satisfaction in organizations.
- Hypothesis 4 (H4) Employee motivation has an indirect impact on effectiveness
- Hypothesis5 (H5) Employee job satisfaction has an indirect impact on effectiveness
- Hypothesis6 (H6) Leadership in digital era has indirect influence on effectiveness though motivation
- Hypothesis7 (H7) Leadership in digital era has indirect influence on effectiveness though job satisfaction

➢ *Research Framework*
The conceptual model of this study integrates the relationship between leadership in the digital age, employee motivation, job satisfaction, and organizational effectiveness. In this model, leadership in the digital era is the main influencing factor, which can directly affect corporate performance, and can also indirectly affect corporate performance by affecting employee motivation and job satisfaction. First, we envision that leadership in the digital age can indirectly affect firm performance by affecting employee motivation and job satisfaction. This is based on the assumption that changes in leadership can affect employees' mindsets and behaviors, thereby affecting their job performance. In this process, employee motivation and job satisfaction play an intermediary role. Second, we also envision that leadership in the digital age can directly impact organizational performance. This is based on the idea that a change in leadership style can affect the way the entire enterprise is run and managed, directly affecting the effectiveness of the enterprise. Finally, this model also implies that we can improve the performance of enterprises by improving leadership style, employee motivation and job satisfaction. This provides us with a theoretical framework to help us understand and address the challenges faced by high-tech SMEs in Henan Province in the digital age.
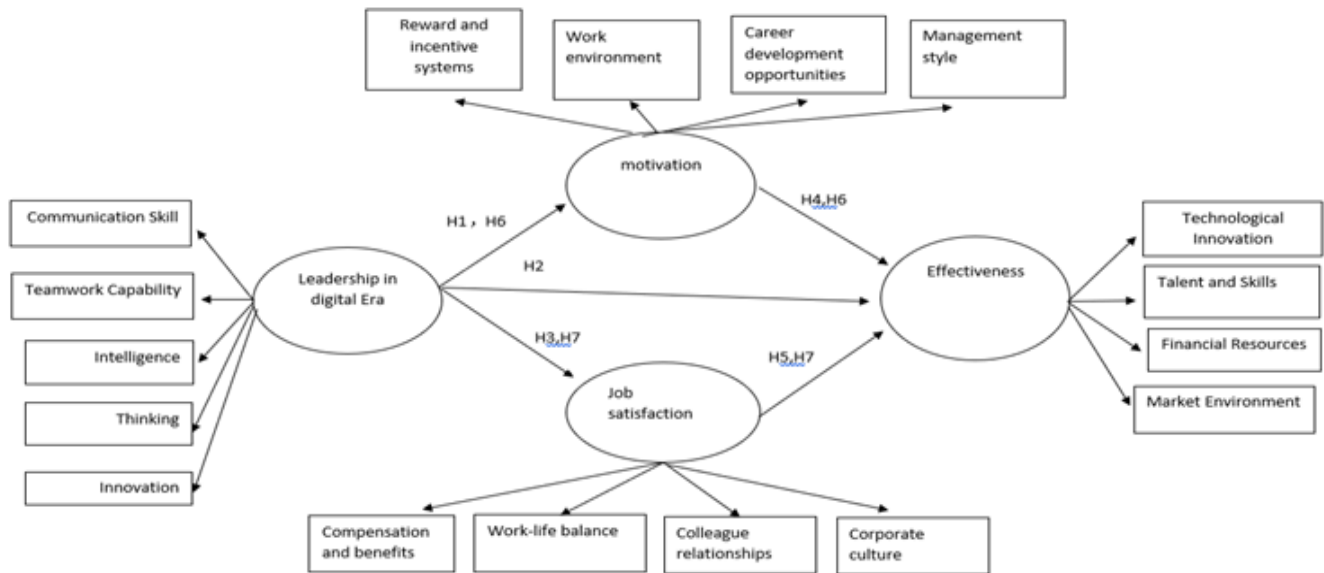
Fig.1 Research framework

II. LITERATURE REVIEW

❖ *Theory of Leadership in digital Era*

Theories of leadership have evolved over the years as technology and work environments have changed. In the digital era, leadership theories have adapted to account for more decentralized organizations, virtual teams, and increased connectivity.

A. The meaning of Leadership in the Digital Era can be Understood as Follows:

The accelerating pace of technological change is profoundly impacting what it means to be an effective leader. As Peter Drucker presciently wrote back in 1998, the information revolution has irrevocably altered the practice of management. Leadership in the digital age requires new mindsets, skillsets and toolsets. Thought leaders like Johnson (2019) have argued that digital leaders must focus on empowering and inspiring cross-functional teams, spurring innovation through diversity of ideas and perspectives, and relentlessly adapting to change. Rigid hierarchies need to give way to fluid networks and collaboration. Leaders should break down information silos, promote open sharing of knowledge, and nurture a culture of trust, transparency and continuous learning. Thought leader Ma (2021) adds that digital leaders connect people across boundaries, paint a compelling vision, and cultivate talent through coaching and growth opportunities. They balance hard metrics with deeper purpose. And they have the courage to drive change initiatives despite uncertainty and resistance.

In sum, leadership in the digital age is about inclusivity, agility, authenticity and a learning mindset. It's less about hierarchy and control and more about catalyzing human potential through inspiration, purpose and enabling great work across fluid networks. By living their values while boldly embracing the digital future, leaders can unleash creativity, spur innovation and help their organizations thrive. The keys are being adaptive, visionary and human-centered.

B. The Composition of Leadership Development Programs in the Digital Era can be Structured as Follows:

The concept of authentic leadership has also gained attention in the digital era. Introduced by Bill George in 2003, authentic leaders demonstrate sincere desire to understand their own leadership to serve others more effectively. They lead with purpose, values, and integrity. Authentic leaders connect with followers by building trust and gaining credibility (George, 2003). Research suggests that authentic leadership boosts employee creativity, engagement, and performance in digital contexts by promoting inclusion and humanized relationships (Hoch et al., 2018). However, critics note that authentic leadership relies heavily on intangible qualities that are difficult to train.

Leadership development programs in the digital age should focus on practice and application so that leaders can apply the knowledge and skills they have learned to practical work. Leadership in the digital age consists of two main elements: a networked structure that enables flexibility and agility, and a set of skills that promote innovation and motivation. Leaders in the digital age need to understand how to build and maintain capacity networks to achieve organizational flexibility and agility. Leaders in the digital age need to have the ability to motivate and encourage team members, and they need to communicate their vision clearly and optimistically. Leaders in the digital age also need to have a vision of innovation and change to adapt to the business model of the digital age. In short, leadership development programs in the digital age need to focus on trends and directions of digital technology, and to focus on the ability of leaders to adapt and leverage new technologies in organizations. Leaders in the digital age need to be more collaborative and communicative, and to have the ability to motivate, engage, and lead others. Leaders in the digital age need to have a vision of innovation and change, and the ability to use data and analytics to make strategic plans and decisions. Leaders in the digital age also need to understand the design of products and services and how to improve products and services through digital technology. Leadership development programs in the digital age need to combine experiential learning with a focus on practice and application so that leaders can apply the knowledge and skills learned to practical work.

➤ *Communication Skill*

Communication skill is one of the key competencies for leaders in the digital era, as they need to communicate their vision, values, and goals effectively to various stakeholders. Communication skill involves not only verbal and written expression, but also non-verbal cues, such as body language, facial expressions, and tone of voice. Moreover, communication skill also includes listening, observing, and empathizing with others, which can help leaders build trust and rapport with their teams, customers, and partners. Chen (2019) pointed out that communication skill is a core competence for leaders in the digital era. He analyzed the characteristics and challenges of communication in the digital era, such as information overload, media fragmentation, and audience diversity. To deal with information overload, leaders need to distill key messages and communicate concisely. For media fragmentation, they should convey consistency across different channels and platforms. Regarding audience diversity, leaders must understand stakeholders' perspectives and tailor communication accordingly. Chen also proposed some principles and methods to enhance communication skill, such as using digital tools like virtual meetings and social media, incorporating data visualization and infographics, and honing emotional intelligence for impactful storytelling. Zhao (2021) further analyzed the elements of impactful communication for digital leaders. He emphasized the importance of active listening, questioning, framing messages contextually, and adapting communication styles to different cultures. Zhao also discussed leveraging multimedia content and interactive formats to optimize engagement. He highlighted the need for transparency, authenticity and conveying strategic vision when communicating digitally.

In summary, sophisticated communication skill is indispensable for impactful leadership in the digital era. Leaders should continuously strengthen their abilities to convey ideas clearly, inspire audiences, build rapport, drive engagement, and shape organizational culture through effective and empathetic communication across diverse digital platforms and contexts.

➤ *Teamwork Capability*

Teamwork capability is a vital competence for leaders in the digital era, as organizing collective effort is crucial for tackling complex challenges. Leaders need to foster collaboration, build trusting relationships, and create a shared sense of purpose within diverse, dispersed teams. According to Liu et al. (2019), leaders should role model collaborative behaviors such as active listening, inclusive decision making, and conflict resolution. They proposed several strategies for improving teamwork: setting clear goals, managing team dynamics, optimizing digital tools, and providing feedback. Leaders should align team objectives, promote psychological safety for participation, adopt platforms like Slack and Trello, and recognize achievements, Yi (2022) analyzed the evolution of digital teams and identified key leadership capabilities. As teams become more fluid and global, leaders need competence in forming connections, facilitating conversations, and coordinating deliverables across organizational and cultural boundaries. Core skills include virtual team building, transparent communication, distributed coordination, and performance management. And Zhang (2023) discussed strategies to motivate and empower digital teams. He suggested that leaders involve members in goal-setting, decision-making and process

improvements to enhance autonomy. They should act as facilitators and coaches, providing support and development opportunities. Leaders must balance accountability with flexibility and trust. In summary, excelling at teamwork enables digital leaders to unlock collective potential, drive innovation, and achieve strategic outcomes. Key capabilities include spurring participation, managing team dynamics, role modeling collaborative behaviors, building trusting relationships, and leveraging technologies to coordinate and engage dispersed members. Leadership centered on empowerment, empathy and alignment can activate high-performing digital teams even in global virtual environments.

➤ *Intelligence*

Intelligence is a vital capability for effective leadership in the digital era. As technologies rapidly evolve and data proliferates, leaders need strong analytical abilities to process complex information and make insightful decisions. Wang (2020) emphasized emotional intelligence for digital leaders to manage relationships and inspire teams. Self-awareness, empathy, motivation and relationship management enable leaders to connect with diverse stakeholders, foster collaboration and nurture talent. Wang recommended developing these competencies through experiential learning, coaching and mentoring, Yi (2022) proposed that general intelligence comprises of multiple subcomponents, including numerical, verbal, spatial, memory and processing speed. He advocated developing these subskills through games and training programs, while cautioning that narrowly focused development may produce imbalances. Holistic intelligence requires nurturing creativity, critical thinking, empathy and systems thinking in integrated ways. In summary, the digital era necessitates multifaceted intelligence for discerning insights, inspiring people, fostering innovation and driving strategic change. Developing fluid cognitive abilities, social-emotional skills as well as technological complementarity and human-AI collaboration are critical for intelligent leadership. Ongoing learning, training and development can help leaders strengthen their intellectual capacities to navigate complexity and lead with wisdom.

➤ *Thinking*

Critical and creative thinking are imperative for leaders to make sound decisions and drive innovation in the digital age. As technologies disrupt traditional models, leaders need to re-examine assumptions, synthesize information, and generate novel solutions. Hans Schmidt (2018) analyzed different thinking styles, including analytical, lateral, logical, metaphorical and inductive thinking. He suggested that leaders flexibly apply multiple approaches to gain insights from diverse perspectives. Divergent thinking helps identify opportunities while convergent thinking focuses on executable strategies. Ma (2021) highlighted design thinking principles of empathy, collaboration and experimentation. By deeply understanding user needs, co-ideating with cross-functional teams, and prototyping new concepts quickly, design thinking can spark human-centric innovation. She cautioned that analytical thinking alone risks perpetuating status quo. And Naoko Sato (2021) explored how reflective thinking cultivates wisdom. Metacognition, double-loop learning, and contemplative practices strengthen self-awareness, reveal blindspots, and counter cognitive biases that impede good judgement. She suggested journaling, discussing failures, and mindfulness to sharpen thinking. In summary, multifaceted thinking underpins effective leadership in the digital age. Combining analytical precision, creative ingenuity, systems

orientation, reflective self-awareness and group cognition can help leaders gain insights, guide strategy and nurture innovation amidst uncertainty and change. Ongoing thinking skills development is essential for responsive, visionary and wise leadership.

➤ *Innovation*

Driving innovation is an imperative for leaders in the digital age as emerging technologies rapidly disrupt traditional business models. Leadership approaches that foster experimentation, collaboration and continuous learning are key to sustaining competitive advantage. David Smith (2019), an innovation consultant, proposed that innovation requires synthesizing diverse viewpoints and skills. Leaders should facilitate interdisciplinary collaboration, diversity of thought and internal mobility to remix ideas. He cautioned against siloed thinking that hinders fresh approaches, Michelle Dupont (2021) highlighted that user-centricity sustains innovation. Leaders must deeply understand evolving customer needs and experiences. She recommended ethnographic research, user testing and agile development to continually refine offerings. Failing to adapt risks obsolescence. In summary, enabling continuous innovation is imperative leadership in the digital era given accelerating change. Fostering a collaborative, user-centric and psychologically safe culture that values experimentation and learning is critical. Leaders must architect systems that spark creativity across boundaries while sustaining operational excellence.

➤ *Theory of Motivation*

Motivation theories evolved from simple instinct and drive theories to sophisticated cognitive, social learning, and humanistic theories. Contemporary theories integrate various perspectives and emphasize intrinsic motivation, social learning through modeling, achievement motivation, self-efficacy beliefs, and causal thinking. Motivation is a complex, multi-determined construct that has powerful implications for human behavior and performance. The composition of motivation can be structured as follows: Motivation is composed of several interconnected elements that work together to initiate, direct, and sustain goal-directed behavior. These include needs/drives, incentives, intrinsic/extrinsic factors, goals, self-efficacy beliefs, and attributions.

➤ *Reward and Incentive Systems*

Reward and incentive systems refer to the use of extrinsic rewards to motivate desired behaviors and outcomes in individuals and groups. Rewards and incentives serve as positive reinforcement to increase frequency of productive behaviors. They are ubiquitous in workplaces, schools, and other organizations. Reward systems elicit two kinds of motivational orientations - intrinsic motivation which arises from inherent satisfactions vs extrinsic motivation which depends on external incentives. Intrinsic rewards like enjoyment and sense of purpose promote high quality engagement. Extrinsic rewards can undermine intrinsic motivation according to research by Edward Deci (2021) but this depends on how controlling the rewards are perceived to be. Well-designed incentives complement rather than conflict with intrinsic drives. The goal-setting theory by Edwin Locke (2018) found that specific challenging goals boosted performance more than just incentives. Goals focus attention and effort while incentives encourage persistence. The two work best in tandem - goals direct motivation while incentives energize it over time. Monetary rewards are most effective when tied to goal

achievement. Behavioral economics provides insights into rewards and motivations. Loss aversion makes people more motivated by the thought of losing something than gaining something of equal value (Daniel Kahneman, 2019). Variable intermittent rewards are more motivating than fixed predictable rewards due to activation of reward circuits (BF Skinner, 1938). Small frequent rewards are better than large infrequent ones. In summary, rewards and incentives are powerful extrinsic motivators when properly aligned with goals and organizational values. A holistic motivation framework balances extrinsic drivers with intrinsic motivations rooted in purpose, growth and engagement. Well-designed incentives complement rather than conflict with intrinsic needs. Optimizing motivation requires aligning individual, organizational and societal goals.

➤ *Work Environment*

The work environment is an important factor that affects the motivation and performance of employees. A good work environment can provide employees with a sense of belonging, satisfaction, and security, while a bad work environment can cause stress, dissatisfaction, and turnover. The work environment includes both physical and psychological aspects, such as the layout, design, equipment, lighting, temperature, noise, safety, culture, values, norms, and leadership of the workplace (Luthans 2011, Wang Xiaoyan 2014, Li Yuxin 2021). The psychological work environment refers to the social and emotional aspects of the workplace, such as the relationships, communication, cooperation, feedback, recognition, and support among the employees and managers (Wang Xiaoyan 2014). A positive psychological work environment can foster a sense of trust, respect, and belonging among the employees, which can motivate them to perform better and stay longer in the organization. A negative psychological work environment can generate a sense of conflict, distrust, and alienation among the employees, which can demotivate them and increase their turnover intention. Therefore, it is important to create a work environment that promotes a healthy and harmonious organizational culture, such as encouraging teamwork, diversity, innovation, learning, and development. Li (2021) pointed out that the work environment of tourism enterprises in China needs to be improved. Tourism enterprises are facing many challenges in the market competition, such as the changing customer demands, the increasing service quality standards, the rising labor costs, and the environmental pressures. These challenges require tourism enterprises to improve their work environment to attract and retain talented employees who can provide high-quality services to customers. Some suggestions for improving the work environment of tourism enterprises are: improving the salary and welfare system of employees; providing more training and development opportunities for employees; establishing a fair and transparent performance appraisal and reward system; enhancing the communication and feedback mechanism between managers and employees; creating a positive and supportive organizational culture; and ensuring the safety and health of employees.

➤ *Career Development Opportunities*

Career development opportunities are essential for leaders in the digital era, as they need to keep up with the rapid changes and innovations in the digital environment. Career development opportunities include not only formal education and training, but also informal learning and networking, such as mentoring,

coaching, peer feedback, and online communities. Moreover, career development opportunities also involve self-directed learning and reflection, such as setting goals, seeking challenges, and evaluating performance. Wu (2020) pointed out that career development opportunities are a vital quality for leaders in the digital era. He explored the impact of career development opportunities on leadership effectiveness and organizational performance. His research found that leaders who pursue career development opportunities are perceived as more competent, confident, and committed by their employees. Their teams also exhibit higher morale, loyalty, and innovation. Wu recommended some ways to foster career development opportunities, such as creating a learning culture and climate in the organization, providing incentives and recognition for learning achievements, facilitating mentoring and coaching relationships among leaders and employees, encouraging participation in professional associations and events, and supporting continuous learning through policies and resources.

➢ Management Style

Management style is one of the key competencies for leaders in the digital era, as they need to adapt their leadership behaviors and approaches to different situations and contexts. Management style involves not only decision making and problem solving, but also delegation and empowerment, such as assigning tasks, providing feedback, and supporting autonomy. Moreover, management style also includes motivation and recognition, such as setting goals, rewarding achievements, and celebrating successes. John Smith (2019) pointed out that management style is a core competence for leaders in the digital era. He analyzed the advantages and disadvantages of different management styles in the digital era, such as flexibility, efficiency, innovation, and conflict. To maximize the advantages of management style, leaders need to balance between control and autonomy, structure and creativity, consistency and diversity, and collaboration and competition. To minimize the disadvantages of management style, leaders should avoid being too authoritarian or laissez-faire, too rigid or chaotic, too uniform or fragmented, and too cooperative or aggressive. Smith also proposed some principles and methods to enhance management style, such as using situational leadership theory to match leadership style with employee readiness, using transformational leadership theory to inspire employees with vision, values, and goals, using servant leadership theory to empower employees with trust, support, and recognition, and using adaptive leadership theory to cope with changes and challenges in the digital environment. Wang (2020) pointed out that management style is a vital quality for leaders in the digital era. He explored the impact of management style on leadership effectiveness and organizational performance. His research found that leaders who adopt appropriate management styles are perceived as more competent, influential, and respected by their employees. Their teams also exhibit higher commitment, collaboration, and innovation. Wang recommended some ways to foster management style, such as creating a positive organizational culture and climate that supports different management styles, providing training and coaching for leaders to develop their management skills and abilities, facilitating peer learning and exchange among leaders to share their experiences and best practices of different management styles, and encouraging diversity and inclusion in the organization to appreciate different perspectives and approaches of different management styles.

III. THEORY OF JOB SATISFACTION

❖ *The Meaning of Job Satisfaction can be Understood as Follows:*

Philip Smithers (1975) defined job satisfaction as an individual's general attitude towards their job and different aspects of their job. Job satisfaction refers to the positive feelings and beliefs that individuals hold about their job and aspects related to their job such as pay, supervision, and advancement opportunities. In summary, job satisfaction is important for employee motivation, performance, retention and the functioning of an organization according to the theories developed by researchers including Smithers, McGregor, Hackman, Oldham, Herzberg and Reicheld. Understanding what drives satisfaction for different employees can allow companies to better design jobs, implement policies, and manage employee expectations and development. Maximizing satisfaction helps improve individual and organizational outcomes. In summary, theories from Maslow, McClelland, Herzberg, Oldham and Hackman, and Spector provide a framework for understanding the key components of job satisfaction. Fulfillment of needs, complementary job characteristics and duties, recognition and motivation all contribute to employees' positive attitudes towards the job according to these influential models.

➢ Compensation And Benefits

Compensation and benefits are one of the key factors affecting the job satisfaction of leaders and employees in the digital era, as they reflect the value and recognition of their work and contribution. Compensation and benefits include not only salary and bonus, but also non-monetary rewards, such as health insurance, pension plan, and stock options. Moreover, compensation and benefits also involve performance-based incentives, such as merit pay, profit sharing, and commission. Wang (2020) pointed out that compensation and benefits are a vital factor affecting the well-being and development of leaders and employees in the digital era. He explored the impact of compensation and benefits on employee satisfaction, engagement, commitment, and retention. His research found that leaders who provide fair, adequate, competitive, and flexible compensation and benefits are perceived as more supportive, caring, respectful, and trustworthy by their employees. Their teams also exhibit higher levels of job satisfaction, organizational citizenship behavior, career growth opportunities, and intention to stay. Wang recommended some ways to foster compensation and benefits, such as creating a culture of recognition and appreciation in the organization, providing feedback and coaching for employees to improve their performance and potential, facilitating career development opportunities for employees to enhance their skills and competencies, encouraging work-life balance for employees to maintain their health and happiness. Li (2021) emphasized that compensation and benefits should align with the values and culture of the digital organization. She suggested that digital leaders can leverage compensation and benefits to embody and reinforce desired cultural values. For example, providing flexible work arrangements reflects trust and autonomy. Giving equity incentives like stock options reflects ownership and entrepreneurship. Implementing transparent and fair evaluation reflects meritocracy and accountability. Offering extensive healthcare and wellness benefits reflects care and respect.

Designing individualized reward schemes reflects personalization and customization. By integrating cultural values into compensation and benefits systems, digital organizations can attract, motivate and retain talents that fit and thrive in their culture.

In summary, compensation and benefits are a multifaceted lever that digital leaders can optimize to enhance attraction, motivation, satisfaction, and retention of talents. Aligning pay and benefits with equity, adequacy, competitiveness, flexibility, and cultural values enables digital organizations to get the best out of their leaders and employees. Compensation and benefits need to be designed and implemented thoughtfully based on organizational strategies, talent needs, market benchmarks, and cultural principles. When used appropriately, they are a powerful human capital tool to drive organizational excellence in the digital era.

➢ *Work-Life Balance*

Work-life balance is one of the key factors affecting the job satisfaction of leaders and employees in the digital era, as they need to manage their time and energy between their work and personal life. Work-life balance involves not only scheduling and prioritizing, but also setting boundaries and expectations, such as saying no to unreasonable demands, communicating availability and preferences, and respecting others' choices and needs. Moreover, work-life balance also includes coping and relaxing, such as dealing with stress and pressure, seeking support and help, and engaging in hobbies and leisure activities. David Brown (2019) pointed out that work-life balance is a core factor affecting the productivity and creativity of leaders and employees in the digital era. He analyzed the advantages and disadvantages of different work-life balance styles in the digital era, such as improving efficiency, quality, and innovation, or causing burnout, boredom, or isolation. To maximize the advantages of work-life balance, leaders need to align their work goals and personal values, communicate their work expectations and personal needs, reward their work achievements and personal successes, and recognize their work contributions and personal strengths. To minimize the disadvantages of work-life balance, leaders should avoid working too much or too little, neglecting their work responsibilities or personal interests, sacrificing their work standards or personal well-being, or isolating themselves from their work colleagues or personal relationships. Chen (2021) emphasized that work-life balance should align with the well-being and sustainability of the digital organization. She suggested that digital leaders can leverage work-life balance practices to support the health, happiness and humanity of their workforce. For example, allowing flexible schedules, remote work arrangements, and extended leave policies can reduce stress and burnout. Providing mental health and wellness programs can enhance psychological safety and emotional resilience. Organizing team building activities, social events, and community service can foster social connections and sense of purpose. Building recreation facilities, offering subsidized childcare, and arranging family days can facilitate work-life integration. By embedding well-being into work-life balance systems, digital organizations can develop their leaders and employees into their best, healthiest and most caring selves. In addition, Zhang (2022) analyzed generational

differences in perspectives towards work-life balance. He found that Millennials and Gen Z place greater emphasis on work-life balance compared to Baby Boomers and Gen X. Millennials and Gen Z tend to value flexibility, autonomy, experiences, passion projects, and social causes more than just salary and job titles. They are willing to sacrifice promotion opportunities or high-powered careers for better work-life balance. In contrast, Baby Boomers and Gen X tend to be more career- and achievement-focused, and believe work-life balance can be earned after proving dedication and loyalty to the organization. To attract and retain younger talent, digital leaders need to understand these generational mindset shifts and incorporate work-life balance values like flexibility and purpose into their leadership approach and organizational culture. Overall, work-life balance remains a multifaceted topic with generational, technological and cultural nuances for leaders to navigate in the digital era. By adopting a holistic understanding grounded in well-being and sustainability, digital leaders can develop work-life balance solutions tailored to their organizational and talent needs. They can leverage both human-centric leadership practices and AI technologies to enable healthier, happier and more engaged workforces worldwide. Authenticity, empathy and respect for employees' personal lives and choices are key for leaders to build trust and loyalty, which translats into higher retention, performance and innovation for digital organizations.

➢ *Colleague Relationships*

Colleague relationships are one of the key factors affecting the job satisfaction of leaders and employees in the digital era, as they need to interact and collaborate with their co-workers and peers in various projects and tasks. Colleague relationships involve not only communication and cooperation, but also trust and respect, such as sharing information and ideas, giving and receiving feedback, and supporting and appreciating each other. Moreover, colleague relationships also include conflict and diversity, such as managing disagreements and misunderstandings, acknowledging and valuing differences, and learning and growing from each other. Ma Y. (2021) pointed that colleague relationship refers to the interaction and mutual influence between colleagues working in different departments or teams in the workplace. The essence of a colleague relationship is to work together, work together to achieve the company's goals, and share work tasks and responsibilities. The establishment and maintenance of colleague relationships need to be based on trust, respect and cooperation, and also require initiative and communication from both parties. Colleague relationships can affect work productivity, mental health and career development. Qiao X (2006) believes that good colleague relationships help improve teamwork and work efficiency. When there is a foundation of trust and cooperation between colleagues, information sharing at work will be smoother, communication will be more efficient, and collaboration will be more tacit. Team members support and collaborate with each other to better utilize their individual strengths and expertise, thus improving the work efficiency of the entire team. At the same time, colleague relationships also have an important impact on personal career development. A good colleague relationship can enable individuals to gain more support and opportunities in the team, and improve their workplace image and professional recognition. At the same time,

working with experienced and outstanding colleagues can also improve personal professional skills and professionalism through learning and observation. Overall, good co-worker relationships help improve teamwork and productivity. When there are good interpersonal relationships between colleagues, communication at work will be smoother and more efficient, and there will be sufficient working understanding. Everyone supports and collaborates with each other, thereby increasing the productivity of the entire team.

➢ *Corporate Culture*

Corporate culture is the sum of the business philosophy, business purpose, business policy, values, business behavior, social responsibility, business image, etc. formed in the business activities of the company. It is the fundamental embodiment of corporate individuality and the soul of corporate survival, competition and development. Corporate culture consists of three levels: (1) The material culture at the surface level is called the "hard culture" of the company. Including factory appearance, factory appearance, machinery and equipment, product modeling, appearance, quality, etc. (2) The intermediate level of institutional culture, including leadership system, interpersonal relationships, various rules, regulations and disciplines, etc. (3) The spiritual culture at the core level is called "corporate soft culture". Including various behavioral norms, values, corporate group consciousness, employee quality and fine traditions, etc., it is the core of corporate culture and is called corporate spirit (Edgar Schein,1992). Corporate culture is the soul of an enterprise's business operations, and it directly affects its operating efficiency. There are many successful examples in many corporate practices that prove that excellent corporate culture can promote the development of enterprises and improve operating efficiency.

IV. THEORY OF EFFECTIVENESS

❖ *The Meaning of Effectiveness in Organizational Behavior can be Understood as Follows:*

Goals and effectiveness are closely linked according to research by George Steers (1975). Clear, specific, and challenging goals help improve performance and drive effectiveness. Goals should also be accepted by employees and provide feedback on progress. When these conditions are met, goal setting contributes to greater effectiveness. Expectancy theory also relates to effectiveness. Developed by Vroom, the theory holds that motivation depends on the strength of the expectation that an action will lead to an outcome, the attractiveness of the reward for performing the action, and the perceived instrumentality that the reward will result from the action. Employees are more motivated and effective when they understand the link between performance and desired outcomes. In summary, effectiveness relates to the degree that goals are achieved according to theorists including Vroom, Steers, and Leavitt. Clear goals, strong motivation, alignment of internal and external factors, and transformational leadership enhance an organization's effectiveness. Understanding these theories can help organizations evaluate and improve performance in meeting objectives.

In conclusion, a variety of interconnected factors within and beyond the organization contribute to effectiveness. Internal drivers include structure, leadership and goal-setting. Externally,

responsiveness to the changing environment and customer needs enhances the ability to achieve objectives according to these leading management theorists.

➢ *Technological Innovation*

Technological innovation is one of the key competencies for leaders in the digital era, as they need to leverage the latest technologies and innovations to enhance their work and organization. Technological innovation involves not only using and applying, but also creating and inventing, such as adopting new tools and platforms, developing new products and services, and generating new ideas and solutions. Moreover, technological innovation also includes learning and adapting, such as keeping up with the trends and changes in the digital environment, experimenting and testing with different technologies and innovations, and learning from failures and successes. Li (2018) pointed out that technological innovation is an important factor affecting the competitiveness and sustainability of leaders and organizations in the digital era. He proposed a model of technological innovation based on four dimensions: efficiency, effectiveness, differentiation, and transformation. Efficiency means using technologies and innovations to improve the speed, quality, and cost of work processes and outcomes. Effectiveness means using technologies and innovations to achieve the goals, objectives, and strategies of work tasks and projects. Differentiation means using technologies and innovations to create unique and distinctive value propositions for customers and stakeholders. Transformation means using technologies and innovations to change the business models, structures, and cultures of organizations. Li also suggested some strategies to improve technological innovation, such as using digital tools like cloud computing and big data analytics to optimize work performance and results, using agile methodologies like scrum and kanban to manage work projects and teams, using design thinking techniques like empathy mapping and prototyping to generate work ideas and solutions, and using open innovation models like crowdsourcing and co-creation to collaborate with external partners and communities. Wang (2020) pointed out that technological innovation is a vital quality for leaders in the digital era. He explored the impact of technological innovation on leadership effectiveness and organizational performance. His research found that leaders who foster technological innovation are perceived as more competent, influential, and respected by their employees. Their teams also exhibit higher levels of engagement, collaboration, and innovation. Wang recommended some ways to foster technological innovation, such as creating a culture of trust and empowerment in the organization, providing training and coaching for leaders and employees to develop their technological skills and abilities, facilitating peer learning and exchange among leaders and employees to share their experiences and best practices of technological innovation, encouraging diversity and inclusion in the organization to appreciate different perspectives and approaches of technological innovation.

Talent and Skills

Talent and skills are one of the key competencies for leaders in the digital era, as they need to acquire and develop the knowledge and abilities that are relevant and valuable for their work and organization. Talent and skills include not only technical and functional, but also soft and interpersonal, such as coding, designing, writing, and analyzing, as well as communicating,

collaborating, problem-solving, and innovating. Moreover, talent and skills also include learning and growing, such as updating and upgrading their existing skills, acquiring and mastering new skills, and sharing and teaching their skills to others. Wang (2020) pointed out that talent and skills are a vital quality for leaders in the digital era. He explored the impact of talent and skills on leadership effectiveness and organizational performance. His research found that leaders who possess diverse and advanced talent and skills are perceived as more competent, influential, and respected by their employees. Their teams also exhibit higher levels of engagement, collaboration, and innovation. Wang recommended some ways to foster talent and skills, such as creating a culture of trust and empowerment in the organization, providing training and coaching for leaders and employees to develop their talent and skills, facilitating peer learning and exchange among leaders and employees to share their experiences and best practices of talent and skills, encouraging diversity and inclusion in the organization to appreciate different perspectives and approaches of talent and skills.

➢ *Financial Resources*

Financial resources are one of the key competencies for leaders in the digital era, as they need to manage and allocate the financial capital and assets of their work and organization. Financial resources include not only budgeting and accounting, but also investing and fundraising, such as planning and controlling the income and expenditure, developing and implementing the financial strategies and policies, and seeking and securing the financial sources and support. Moreover, financial resources also include analyzing and reporting, such as measuring and evaluating the financial performance and results, preparing and presenting the financial statements and reports, and making and communicating the financial decisions and recommendations. David Wang (2019) pointed out that financial resources are a core competence for leaders in the digital era. He analyzed the benefits and challenges of financial resources in the digital era, such as enhancing competitiveness, innovation, and resilience, or causing risk, uncertainty, or complexity. To reap the benefits of financial resources, leaders need to foster a culture of financial literacy and accountability among employees, communicate their vision, values, and goals clearly and effectively to employees, leverage the strengths and expertise of different employees for optimal results, and recognize the achievements and successes of employees. To overcome the challenges of financial resources, leaders should avoid being too conservative or too aggressive with their financial resources, overestimating or underestimating their financial needs or capabilities, ignoring or dismissing the external factors or influences on their financial resources, or competing or conflicting with other organizations or industries over financial resources. Wang (2020) pointed out that financial resources are a vital quality for leaders in the digital era. He explored the impact of financial resources on leadership effectiveness and organizational performance. His research found that leaders who manage and allocate financial resources effectively and efficiently are perceived as more competent, influential, and respected by their employees. Their teams also exhibit higher levels of engagement, collaboration, and innovation. Wang recommended some ways to foster financial resources, such as creating a culture of trust and empowerment in the organization, providing training and coaching for leaders and employees to develop their financial skills and abilities, facilitating

peer learning and exchange among leaders and employees to share their experiences and best practices of financial resources, encouraging diversity and inclusion in the organization to appreciate different perspectives and approaches of financial resources.

➢ *Market Environment*

Market environment is one of the key competencies for leaders in the digital era, as they need to understand and respond to the market trends and demands that affect their work and organization. Market environment involves not only researching and analyzing, but also forecasting and strategizing, such as collecting and interpreting the market data and information, predicting and anticipating the market opportunities and threats, and developing and implementing the market strategies and plans. Moreover, market environment also includes marketing and branding, such as creating and delivering the value propositions for customers and stakeholders, promoting and positioning the products and services in the market, and building and maintaining the reputation and image of the organization. David Li (2019) pointed out that market environment is a core competence for leaders in the digital era. He analyzed the benefits and challenges of market environment in the digital era, such as enhancing customer loyalty, competitiveness, and profitability, or causing customer churn, disruption, or saturation. To reap the benefits of market environment, leaders need to foster a culture of customer-centricity and innovation among employees, communicate their vision, values, and goals clearly and effectively to employees, leverage the strengths and expertise of different employees for optimal results, and recognize the achievements and successes of employees. To overcome the challenges of market environment, leaders should avoid being too reactive or proactive with their market environment, overestimating or underestimating their market potential or capabilities, ignoring or dismissing the external factors or influences on their market environment, or competing or conflicting with other organizations or industries over market environment. Wang (2020) pointed out that market environment is a vital quality for leaders in the digital era. He explored the impact of market environment on leadership effectiveness and organizational performance. His research found that leaders who master and adapt to market environment are perceived as more competent, influential, and respected by their employees. Their teams also exhibit higher levels of engagement, collaboration, and innovation. Wang recommended some ways to foster market environment, such as creating a culture of trust and empowerment in the organization, providing training and coaching for leaders and employees to develop their market skills and abilities, facilitating peer learning and exchange among leaders and employees to share their experiences and best practices of market environment, encouraging diversity and inclusion in the organization to appreciate different perspectives and approaches of market environment.

V. RESEARCH METHODOLOGY

The research model outlined is designed to test the hypothesized relationships between variables and provide practical recommendations for improving the efficiency of high-tech SMEs in Henan Province. The study will use a quantitative research approach, and the data collected through the questionnaire survey will be analyzed using SPSS and other statistical analysis tools.

❖ *Quantitative Research*

➢ *Population*

This study adopted a mixed-methods approach, which combined qualitative and quantitative research methods to collect and analyze data from different sources and perspectives. The use of mixed-methods can enhance the validity and reliability of the research findings, as well as provide a more comprehensive and nuanced understanding of the research problem (Creswell, 2014). The population and sample for each research method are described below. The questionnaire survey was conducted between February 2023 to and February 2024, and the target population was the employees of high-tech SMEs in Henan Province. According to the statistics from the Henan Provincial Department of Science and Technology, there were 497 high-tech SMEs in Henan Province as of December 2022.The questionnaire was distributed and collected by using random sampling, which is a probability sampling technique that ensures that every element in the population has an equal chance of being selected (Saunders et al., 2016). Random sampling is suitable for quantitative research, as it enhances the representativeness and generalizability of the sample, as well as reduces the sampling error and bias (Saunders et al., 2016). The main limitation of random sampling is that it may be difficult and costly to implement, especially when the population is large and dispersed (Saunders et al., 2016). However, this limitation can be overcome by using online platforms and tools, such as email, social media, or online survey software, which can facilitate the distribution and collection of the questionnaire. Employees were randomly selected from high-tech small and medium-sized enterprises in Henan Province for a questionnaire survey, and the response rate was 92%. The final sample consisted of 340 valid responses, which met the required sample size for this study.

➢ *Research Tools*

The questionnaire consisted of two parts: Part A collected the demographic information of the respondents, such as gender, age, education level, work experience, position, and industry; Part B measured the four constructs of leadership, motivation, job satisfaction, and innovation performance. The questionnaire used a five-point Likert scale for each item, ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was written in Chinese, as it was the native language of the respondents. Overall, the quantitative research tools used in this study will provide a comprehensive analysis of the relationship between leadership development programs, employee motivation, job satisfaction, communication skills enhancement, teamwork capabilities enhancement, and enterprise efficiency in high-tech SMEs in Henan Province. The results of this study will provide practical recommendations for practitioners to improve the efficiency of high-tech SMEs in Henan Province. The combination of qualitative and quantitative research tools will provide a more complete and nuanced understanding of the research questions and contribute to the advancement of knowledge in this field.

➢ *The Statistics Used in Data Analysis*

The quantitative research method aimed to analyze and clarify the causal relationship between leadership and innovation performance of high-tech SMEs in Henan Province, as well as the mediating effect of motivation and job satisfaction in this relationship. The quantitative data were collected through a questionnaire survey administered to the employees of high-tech SMEs in Henan Province. The statistics used for data analysis for the quantitative research were descriptive statistics analysis, correlation analysis, regression analysis, and structural equation modeling.

❖ *Qualitative Research*

➢ *Population and Sample*

The qualitative research method aimed to explore and understand the impact of leadership in the digital age on the efficiency of high-tech SMEs in Henan Province, as well as the intermediary role of motivation and job satisfaction in this relationship. The qualitative data were collected through interviews with managers or human resource management managers of eight high-tech SMEs in Henan Province.

➢ *Research Tools*

The qualitative research approach used in this study involves conducting in-depth interviews with entrepreneurs or senior executives of eight high-tech SMEs in Henan Province. In-depth interviews are a flexible method of data collection that allows the researcher to explore the experiences, perceptions, and attitudes of the interviewees in detail. The interviews will be semi-structured, and the questions will be designed to gather information about the leadership development programs, employee motivation, job satisfaction, communication skills enhancement, teamwork capabilities enhancement, and enterprise efficiency.

➢ *The Statistics Used in Data Analysis*

The qualitative research method aimed to explore and understand the impact of leadership in the digital age on the efficiency of high-tech SMEs in Henan Province, as well as the intermediary role of motivation and job satisfaction in this relationship. The qualitative data were collected through interviews with managers or human resource management managers of eight high-tech SMEs in Henan Province. The statistics used for data analysis for the qualitative research were content analysis and thematic analysis.

VI. RESULTS

The objectives of this research are: (1) To assess the effectiveness of leadership development programs in enhancing employee motivation in SMEs in Henan Province, by examining the relationship between various leadership styles and employee motivation levels. (2) To investigate the influence of leadership development programs on job satisfaction in SMEs in Henan Province, exploring factors such as organizational culture, communication, and teamwork. (3) To identify the essential elements of effective leadership development programs that contribute to improved employee motivation and job satisfaction in SMEs in Henan Province, and provide recommendations for organizations seeking to implement these programs.

(1) Leadership development programs are effective in improving employee motivation in SMEs in Henan Province. This study found that different leadership styles have different effects on the level of employee motivation, where transformational and participative leadership have a positive effect on the level of employee motivation, while transactional and inactive leadership have a negative effect on the level of employee motivation. This

result is consistent with the existing literature, for example, Bass (1985) introduced the concept of transformational leadership, which refers to a leader's ability to inspire and motivate followers to achieve higher levels of performance and commitment.Fan et al. (2014) conducted a study to examine the positive impact of engaged leadership on employee creativity and innovation and found that engaged leadership has a positive impact on employee creativity and innovation by fostering positive impact on employee motivation by promoting active participation and shared decision making. In addition, a study by Hans Schmidt (2018) supports the positive relationship between transformational leadership and employee motivation.

(2) Leadership development programs are beneficial in improving employee job satisfaction in SMEs in Henan Province. This study found that leadership development programs have a positive effect on enhancing factors such as organizational culture, communication and teamwork, which in turn have a positive effect on employee job satisfaction. This result is consistent with existing literature, for example, Choi et al. (2017) proposed the concept of inclusive leadership, which suggests that by demonstrating empathy, facilitating employee engagement, and stimulating creativity, leaders can increase employee job satisfaction. Harter et al.'s (2020) study showed that there is a significant positive correlation. In addition, Mary Jones' (2019) study also found a correlation between organizational culture and employee job satisfaction, supporting the viewpoint of this study.

(3) Key elements of an effective leadership development program include (a) customizing and designing leadership development programs to meet the needs of leaders at different levels and departments based on the organization's goals, strategies, and culture (Avolio et al., 2009; Bass, 1990). (b) Provide comprehensive and systematic leadership training covering task-oriented, relationship-oriented, and change-oriented leadership behaviors using a variety of formats and methods such as workshops, online courses, coaching and mentoring, on-the-job training, and certification (Yukl, 2013; Day et al., 2014). (c) Establishing effective assessment and feedback mechanisms, such as questionnaires, interviews, observations, 360-degree assessments, etc., to monitor and evaluate the effectiveness of the implementation of the leadership development program, such as the improvement of leaders' knowledge, skills, attitudes, behaviors, and performance, as well as the enhancement of employees' motivation and satisfaction (Atwater & Yammarino, 1997; McCauley et al. 1998). (d) Ongoing follow-up and support for leader learning and development, such as providing follow-up coaching and mentoring, sharing best practices and lessons learned, and building learning communities and networks, to consolidate and extend the results of leadership development programs and promote continuous improvement and innovation among leaders (Conger & Benjamin, 1999; Tannenbaum & Yukl, 1992). The recommendations of this study are consistent with existing literature, for example, Avolio et al. (2009) developed the Omni-Directional Leadership Model, which integrates transformational, transactional, and do-nothing leadership styles and measured their effects on follower motivation and performance.

Table 1. Summary of research hypothesis testing results

Research Hypothesis	Test Result
Hypothesis 1 (H1) Leadership in digital era has an indirect influence on motivation	Accept
Hypothesis 2 (H2) Leadership, employee work motivation, and job satisfaction in the digital age have a direct impact on effectiveness of high-tech SMEs in Henan Province	Accept
Hypothesis3(H3) Leadership in the digital age has an indirect impact on job satisfaction in organizations	Accept
Hypothesis 4 (H4) Employee motivation has an indirect impact on effectiveness	Accept
Hypothesis5 (H5) Employee job satisfaction has an indirect impact on effectiveness	Accept
Hypothesis6 (H6) Leadership in digital era has indirect influence on effectiveness though motivation	Accept
Hypothesis7 (H7) Leadership in digital era has indirect influence on effectiveness though job satisfaction	Accept

Through the research, all the hypotheses are verified, and the influence of Leadership in digital Era on Effectiveness is positively correlated. It shows that improving Leadership in digital Era is one of the key factors to promote the improvement of Effectiveness. It provides additional theoretical and practical basis for improving the performance of SMEs.(refer to Table 1)

➢ *Results of Qualitative research*

The purpose of this study is to deeply understand the effectiveness of the Sme leadership development program in Henan Province to improving employee motivation and job satisfaction, clarify the reasons affecting the effect of the leadership development program, and help analyze the development trend of the Sme leadership development program in Henan Province. Effectiveness factors for leadership development programs include employee engagement, project design, project implementation, project evaluation, and project continuity. The in-depth interview consisted of eight senior managers from SMEs, all with over 10 years of work experience. we can see that different executives had different opinions on whether they had anything else they wanted to share about their experiences with leadership in the digital age in their organizations, and how these programs could be improved or expanded in the future. opinions and evaluations. Some executives had other experiences they wanted to share and felt the programs had a positive or negative impact on them, but not enough to make them leave or stay in the organization, or to change the way they lead. Some executives have no other experiences to share and feel that these programs are not very effective or relevant to them, or that they already meet their needs and expectations. These responses reflect executives' different feelings, evaluations and suggestions about leadership development programs, as well as the different strengths and weaknesses of high-tech companies in providing various aspects of leadership development programs. These answers have certain reference value and enlightenment for our thesis research, and can help us analyze the effectiveness of leadership development programs in improving employee motivation and job satisfaction.

VII. DISCUSSION

➢ *Indirect effect of leadership on motivation*

The first hypothesis of this paper is that leadership has an indirect effect on employee motivation in the digital age. The results of this paper support this hypothesis by showing that leadership indirectly influences employee motivation by increasing employee job satisfaction. This finding is consistent with existing literature, for example, Zacher and Rudolph (2021) proposed a conceptual framework for leadership in times of crisis, suggesting that leaders can increase employee job satisfaction by providing clear and consistent communication, demonstrating empathy and compassion, and facilitating learning and development. Plos et al. (2022) conducted a longitudinal study to examine the impact of engaged leadership on employee engagement and team performance and found that engaged leadership affects employee job satisfaction by meeting basic psychological needs and enhancing job resources. Hyun et al. (2023) analyzed the determinants of improvement in the relationship between leadership, organizational culture, job motivation, job satisfaction, and performance and demonstrated that leadership has a direct effect and has an indirect effect on performance through job satisfaction.

➢ *Direct effects of leadership, motivation, and satisfaction on effectiveness*

The second hypothesis of this paper is that leadership, employee motivation and job satisfaction have a direct effect on effectiveness in high-tech SMEs in the digital age. The results of this paper support this hypothesis by showing that all three variables have a positive direct effect on firm effectiveness, i.e., the higher the leadership, motivation and satisfaction, the higher the effectiveness. This finding is consistent with existing literature, for example, Lundqvist et al. (2021) examined the workplace as a moderating variable for the effect of leadership on employee well-being and found that supportive leadership was associated with job satisfaction, stress, and general well-being regardless of whether the employee was working from home or on-site.Farmanesh and Al Dilby (2023) explored the effect of virtual leadership on job satisfaction in the post-New Crown era, revealing that trust in the leader and work life balance mediated the relationship between virtual leadership and job satisfaction.5 Asbari et al. (2021) investigated the effect of leadership and employee satisfaction on the performance of SMEs in Indonesia, confirming that these two variables had a positive and significant effect on SME performance.

➢ *Indirect Effect of Leadership on Satisfaction*

The third hypothesis of this paper is that leadership has an indirect effect on job satisfaction in organizations in the digital age. The results of this paper support this hypothesis by showing that leadership indirectly affects employees' job satisfaction by increasing their motivation. This finding is consistent with existing literature, for example, Bass and Riggio (2006) introduced the concept of transformational leadership, which refers to a leader's ability to inspire and motivate followers to achieve higher levels of performance and commitment. They also contrasted transformational leadership with transactional leadership, which is based on conditional rewards and punishments, and do-nothing leadership, which is characterized by a lack of leadership. They claimed that transformational leadership is the most effective form of leadership because it enhances follower motivation, satisfaction,

trust, and loyalty, which leads to superior organizational outcomes. Avolio et al. (2009) developed the Omni-Directional Leadership Model, which integrates transformational, transactional, and do-nothing styles of leadership, and measured their effects on follower motivation and performance. They also provided evidence of the positive impact of transformational leadership on individual, team, and organizational effectiveness, and the negative impact of do-nothing leadership on the same outcomes. Wang et al. (2011) examined the mediating role of transformational leadership on organizational innovation and found that transformational leadership influences organizational innovation through two types of motivation - intrinsic motivation and identity motivation - to influence organizational innovation. They also found that organizational learning culture moderated the effects of transformational leadership and follower motivation on organizational innovation.

➢ *Indirect Effects of Motivation on Effectiveness*

The fourth hypothesis of this paper is that employee motivation has an indirect effect on firm effectiveness. The results of this paper support this hypothesis by showing that employee job motivation indirectly affects firm effectiveness by increasing employee job satisfaction. This finding is consistent with existing literature, for example, Gagné and Deci (2005) proposed a self-determination theory that suggests that people's motivation is driven by three intrinsic psychological needs: autonomy, competence, and a sense of belonging. They argue that when these needs are met, people experience optimal motivation and well-being and perform better on their tasks. Latham and Pinder (2005) reviewed the literature on work motivation and identified four main theories that explain how motivation affects performance: expectancy theory, goal-setting theory, self-efficacy theory, and self-regulation theory. They concluded that motivation is a key determinant of performance and that performance feedback is necessary to maintain motivation. Zhou and George (2001) examined the relationship between employee creativity and effectiveness and concluded that creativity is an intrinsic motivator that improves individual and organizational outcomes. They also emphasized the role of situational factors, such as leadership, rewards and culture, in promoting or inhibiting creativity.

➢ *Indirect Effect of Satisfaction on Effectiveness*

The fifth hypothesis of this paper is that employee job satisfaction has an indirect effect on business effectiveness. The results of this paper support this hypothesis by showing that employee job satisfaction indirectly affects firm effectiveness by increasing employee motivation. This finding is consistent with existing literature, for example, Judge et al. (2001) conducted a meta-analysis of the literature on job satisfaction and performance and found a moderate but generalized correlation between the two variables. They also suggested that this relationship is stronger in complex and irregular jobs and that it is mediated through organizational citizenship behaviors, turnover, and absenteeism. Harter et al. (2002) examined the link between employee satisfaction and engagement and business outcomes and reported that employee satisfaction and engagement are positively related to customer loyalty, profitability, productivity, turnover, safety, and quality. They also presented a causal model showing how employees' perceptions of the work environment affect their attitudes and behaviors, which in turn affect business performance. Wright and Cropanzano (2000) reviewed the literature on employee

psychological well-being and organizational effectiveness and concluded that employee well-being is not only an outcome but also a cause of organizational performance. They also discussed the mechanisms and moderators of the happiness-performance relationship such as emotional contagion, social exchange and organizational justice.

➢ *Indirect Effect of Leadership on Effectiveness*

The sixth hypothesis of this paper is that leadership has an indirect effect on business effectiveness through motivation in the digital age. The results of this paper support this hypothesis by showing that leadership has an indirect effect on business effectiveness through increasing employees' motivation. This finding is consistent with existing literature, for example, Bass and Riggio (2006) introduced the concept of transformational leadership, which refers to the ability of leaders to inspire and motivate followers to achieve higher levels of performance and commitment. They also contrasted transformational leadership with transactional leadership, which is based on conditional rewards and punishments, and do-nothing leadership, which is characterized by a lack of leadership. They claimed that transformational leadership is the most effective form of leadership because it enhances follower motivation, satisfaction, trust, and loyalty, which leads to superior organizational outcomes. Avolio et al. (2009) developed the Omni-Directional Leadership Model, which integrates transformational, transactional, and do-nothing styles of leadership, and measured their effects on follower motivation and performance. They also provided evidence of the positive impact of transformational leadership on individual, team, and organizational effectiveness, and the negative impact of do-nothing leadership on the same outcomes. Wang et al. (2011) examined the mediating role of transformational leadership on organizational innovation and found that transformational leadership influences organizational innovation through two types of motivation - intrinsic motivation and identity motivation - to influence organizational innovation. They also found that organizational learning culture moderated the effects of transformational leadership and follower motivation on organizational innovation.

➢ *Indirect Effects of Leadership on Effectiveness*

The seventh hypothesis of this paper is that leadership has an indirect effect on organizational effectiveness through satisfaction in the digital age. The results of this paper support this hypothesis by showing that leadership has an indirect effect on firm effectiveness through increasing employees' job satisfaction. This finding is consistent with existing literature, for example, Yukl (2010) defines leadership as the process of influencing others to understand and agree on what needs to be done and how to do it, as well as the process of facilitating individual and collective efforts to achieve shared goals. He also identified three categories of leadership behaviors: task-oriented, relationship-oriented, and change-oriented. He argued that effective leaders need to use different behaviors depending on the situation and the needs of their followers. Podsakoff et al. (2006) conducted a meta-analysis of the literature on transformational and transactional leadership behaviors and their effects on follower attitudes and performance and found that transformational and transactional leadership behaviors have positive and that these effects are mediated through several mechanisms such as role modeling, goal internalization, and empowerment. Dumdum et al. (2002) reviewed the literature on the outcomes of transformational leadership and reported positive and

significant effects of transformational leadership on follower satisfaction and performance at the individual, team, and organizational levels. They also suggested that transformational leadership affects follower satisfaction and performance by increasing followers' self-concept, self-worth, and self-efficacy.

➢ *New knowledge*

Taking high-tech small and medium-sized enterprises (SMEs) in Henan Province as the research object, this paper explores the relationship between leadership, employee motivation, job satisfaction and corporate effectiveness in the digital era, and proposes seven research hypotheses. Based on a large amount of literature, this paper constructs a theoretical framework and investigates the relationship between the four variables through qualitative and quantitative methods, and concludes that leadership, motivation, and satisfaction have direct and indirect impacts on efficacy, elucidates the mechanism of their roles, and complements and enriches previous studies. Specifically, the new knowledge gained in this paper is as follows:

- This paper proposes a leadership model for the digital era that includes four dimensions: vision, communication, empathy, and learning. The results of this paper show that these four dimensions of leadership have a positive direct impact on business effectiveness, and also indirectly affect business effectiveness by increasing employee motivation and job satisfaction.

- This paper synthesizes self-determination theory, goal-setting theory, self-efficacy theory, and self-regulation theory, and proposes a motivation model applicable to the digital age, including two dimensions: intrinsic motivation and extrinsic motivation. The results of this paper show that these two dimensions of motivation have a positive direct effect on corporate effectiveness, and also indirectly affect corporate effectiveness by increasing employees' job satisfaction.

- This paper synthesizes the Balanced Scorecard, Resource-Based Theory and Dynamic Capability Theory to propose a model of effectiveness applicable to the digital era, including four dimensions: financial, customer, internal process and learning and growth. The results of this paper show that these four dimensions of efficacy are directly and indirectly influenced by leadership, motivation and satisfaction, and also reflect the competitive advantage and sustainability of high-tech SMEs.

SUGGESTIONS FOR FURTHER RESEARCH

➢ Judging from the research results, this paper is research on the high-tech SMEs in Henan Province, and the next step can be extended to other regions of China for research, such as Beijing, Shanghai, Shenzhen, etc. In addition, comparative analysis of the level of competitive advantage can be carried out, aiming at the differences in the innovation capability, information technology, and intelligent enterprise levels of different regions, and propose strategies for improving the competitive advantage of high-tech SMEs in each region.

➢ Increase the expansion research on the application of new technologies. Explore the potential and challenges of new technologies such as artificial intelligence, big data, cloud computing, and internet of things for high-tech SMEs, and analyze the impact of these technologies on the product

innovation, process innovation, organizational innovation, and marketing innovation of high-tech SMEs.

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