Nurturing Talent For Digital Transformation By Integrating Digital Upskilling With Career Pathing: A Case Study of A Company In Japan's Energy Infrastructure Sector

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Abstract.

This case study examines an intervention implemented by a company in Japan's energy infrastructure sector to nurture digital talent. This intervention involved a digital upskilling program integrated with a career pathing program. The digital upskilling program delineated three categories of digital talent, corresponding to those in the Digital Transformation Promotion Skill Standard, and provided core courses for all employees along with category-specific courses. The career pathing program introduced the statuses of Digital Player and Digital Specialist, which employees could earn if they met the required conditions. Feedback on the intervention was obtained post-intervention through a questionnaire conducted among employees (n = 500, effective response rate of 95%) and interviews with ten employees who had gained the Digital Player status. The questionnaire responses revealed a difference between general and managerial staff in the level of interest in digital transformation and their ability to envisage applying digital technology in practice. The responses also suggested that the integrated intervention inspired younger employees to take initiative and encouraged a transformation in corporate culture. The case study provides a best-practice model for designing digital upskilling and career pathing programs in large, traditional companies in Japan.

Keywords: *Digital transformation, Digital talent development, Corporate training, Organizational culture and Career path.*

I. INTRODUCTION

Japan's Ministry of Economy, Trade and Industry [1] claims that Japan is falling behind other countries in digital transformation (DX), noting that work practices in Japan have traditionally been bureaucratic and process-oriented. These characteristics impede the adoption of technology-driven workflows. Japan has certainly benefitted from a process-oriented approach that emphasizes ensuring that each process is completed with accuracy; this approach has improved the quality of Japanese products and services. However, with Japan now facing a dwindling and graying population, it can no longer afford to lag in DX.

This issue is not unique to Japan. Organizational inertia negatively affects a company's digital capabilities, and this limiting impact is greater in legacy organizations [2]. The present work considers a case study of a large company in Japan's energy infrastructure sector. Although the case study involves a Japanese company, it is broadly generalizable in that it offers plenty of insights that are relevant to legacy firms

worldwide. The case study identifies an approach for overcoming organizational inertia by integrating upskilling with career pathing.

First, this case study examines the company's digital upskilling program for employees and how this program was integrated with the company's career pathing program. Kodama [3] examined whether disparities in the digitalization of talent management processes can be attributed to company size and concluded that company size explains variations across all stages of these processes, as larger companies can make greater use of financial resources, talent, and digital platforms. While digital operators may have made progress in digitizing talent management and other back-office functions, digitized talent-management data often goes underutilized among the front-end operations.

By contrast, the company in this case study took an organization-wide approach (encompassing frontend operations) in its intervention to improve digital literacy and build a team of Digital Specialists. In doing so, it illustrated how integrating an upskilling program with a career pathing program can reduce resistance to digital technology in a legacy company with a conservative corporate culture.

Second, the case study demonstrates that integration between upskilling and career pathing is essential in embedding upskilling as a sustained process rather than a temporary one. When it comes to nurturing digital talent, PricewaterhouseCoopers Japan has emphasized the importance of identifying employees' skill sets and then supporting their career pathing. To that end, it recommends a three-stage process: skillset, career pathing, and redeployment [4]. The intervention analyzed in this case study aligns with this process in that it involved upskilling followed by career pathing.

This case study and the intervention it analyzes offer practical insights into aligning digital upskilling (DX talent development) with career pathing. Although experts have produced literature on digital upskilling and career pathing for digital talent, to the best of my knowledge, no prior study has analyzed the integration between the two and drawn practical insights from such an analysis. Thus, the present analysis and findings offer numerous insights for companies seeking to achieve a DX.

II. BACKGROUND

Various companies are grappling with the challenge of digitalization, including those in the energy infrastructure sector worldwide. This sector, being a conservative and frontend-oriented sector, is among the least digitally transformed industries. As such, a company in the energy infrastructure sector provides a useful case study that can offer cross-border insights for digitally transforming legacy companies worldwide.

In the company in question (Company A), the strategic planning team had worked on a digitalization agenda, but the agenda had floundered amid a series of setbacks. The team conducted an inquiry to determine the cause of failure. The inquiry suggested that the failure resulted from employees' low enthusiasm for digital technology and their limited digital literacy.

In a questionnaire survey conducted prior to the intervention among engineering and maintenance teams, many respondents stated, "I'm unfamiliar with digital [technology]," "I'm too busy with frontend

operations to have any time for that," and "I am interested, but I have no opportunities to learn about it, as my boss prioritizes frontend operations." In response to this feedback, Company A decided to introduce an integrated training program to improve digital literacy. The author was involved in this program from the development stage onward.

The feedback also highlighted the lack of integration between the upskilling and career pathing. In response, Company A adjusted career pathing processes as part of its efforts to create an environment conducive to self-driven digital upskilling. The theoretical methodology for Company A's intervention is outlined below.

III. MATERIALS AND METHODS

Of the three stage-process recommended by PricewaterhouseCoopers Japan (skillset, career pathing, and redeployment), the intervention covered the first two: upskilling and career pathing. Each is discussed below.

Before designing the upskilling program, Company A defined what digital talent is. While there is some debate regarding the definition of digital talent, a quango of Japan's Ministry of Economy, Trade and Industry has presented a systematic definition of what is known in Japanese as *DX jinzai* (literally, "digital-transformation talent," rendered in this translation as "digital talent") as part of its Digital Transformation Promotion Skill Standard (DSS-P). Based on the Skills Framework for the Information Age (SFIA), an English-language framework produced by the UK-based SFIA Foundation, the DSS-P provides a framework outlining five categories of digital talent.

Table 1 outlines the DSS-P and SFIA. One difference between the frameworks is that the DSS-P gives greater emphasis to skills and competencies related to horizontal collaboration (interdivisional or cross-functional coordination). The context for this difference is the concern that Japanese companies tend to be bureaucratic and siloed (vertically structured).

Table 1. Differences between the SFIA and DSS-P

Aspect	SFIA	DSS-P
Skills directory	Over 100 skills	Five skill categories and a set of cross-category skills
Levels of responsibility	Seven	Implicitly adopts the same level structure
Behavioral metrics	Autonomy/influence/complexity/knowledge/ behavioral factors	Uses the metrics structure
International application	Applied in at least 200 countries	Localized to Japan

The DSS-P's five-category structure of digital talent has been adopted in an official government publication (Information-Technology Promotion Agency, 2026), as shown in Fig. 1.

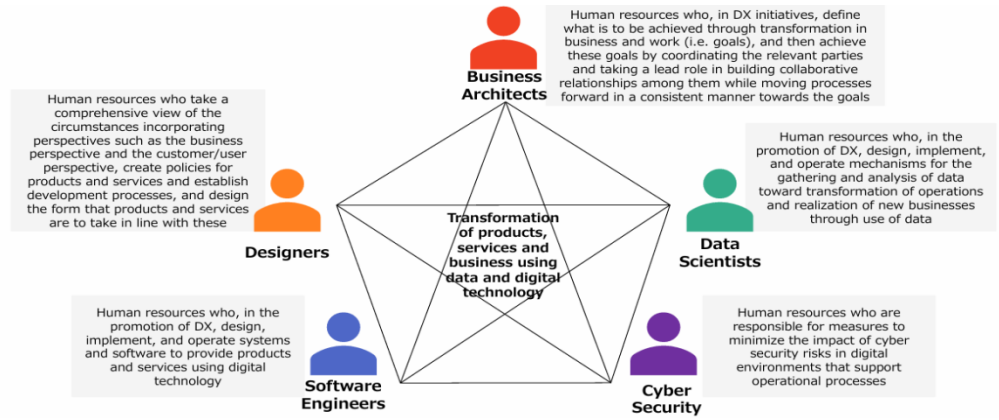

Fig. 1. Five-category structure of digital talent in the DSS-P

Source: The Digital Skill Standards ver. 1.2 (DSS)

(https://www.ipa.go.jp/jinzai/skill-standard/dss/about.html)

The five-category structure of digital talent was applied in the intervention with modification. Company A deemed this modification necessary to align with its characteristics. The DSS-P applies to digital professionals in general, but Company A, being a legacy company as opposed to an information technologies (IT) company, does not have all five types of talent in its internal workforce. Of the five categories, Company A retained "business architects," "data scientists," and "designers," and removed "software engineers" and "cyber security." Software engineers and cybersecurity professionals are highly specialized roles, and Company A intends to outsource these functions in the future. For the three remaining categories, Company A adopted the following curriculum.

Table 2. Curriculum for digital upskilling designed by Company A

Mandatory for all employees	Core digital literacy skills	Core knowledge for digital literacy Skills for driving business transformation Practical workshop Project management skills
Elective (employees can choose whether to apply)	Digital architects	Strategic framework Planning a digital strategy Workshop on workplace-specific digital strategies
Elective	Digital designers	Core skills for design thinking Workshop on good user interface and user experience (UI / UX) design App design training
Elective	Data scientists	Core statistical skills Training in analytics tools Workshop on analytics with internal data

The training programs outlined in Table 2 were strategically designed to facilitate a tiered progression of digital maturity across the organization, addressing both individual skill gaps and broader institutional resistance. The "course on core digital literacy skills," which was mandatory for all 1,500 employees, focuses on foundational digital literacy, including data ethics, cybersecurity basics, and the strategic importance of DX. By establishing this common knowledge base, the company aimed to lower psychological barriers and mitigate organizational inertia, which is often a significant hurdle in legacy infrastructure firms where traditional operational methods and hierarchical silos are deeply entrenched. This foundational layer was essential for fostering a "digital-first" mindset, ensuring that subsequent, more advanced interventions would be met with receptivity rather than resistance across all levels of the workforce.

In contrast, the "category-specific courses" (specialized courses) for potential Digital Players and Digital Specialists shift the focus from theoretical understanding to practical, high-impact application. These modules incorporate low-code development, agile methodologies, and data visualization tools, enabling employees to identify, analyze, and automate persistent inefficiencies within their immediate work environments. For the Digital Specialist track, the curriculum includes advanced analytics, strategic architecture, and project management methodologies aligned with international standards. This ensures that the internal talent pool remains globally competitive and capable of leading complex, cross-departmental initiatives that require high-level technical integration and visionary leadership.

Regarding the operational scale, the course on core digital literacy skills was delivered over a three-year cycle to reach the entire workforce without disrupting essential energy supply operations. In the first year alone, 500 employees completed the training, ensuring a steady infusion of digital awareness across diverse functional departments. The category-specific courses, being voluntary and more intensive, were delivered in three terms to a total of 60 selected candidates (20 per term). Each of these specialized sessions lasted for five full days, providing a dedicated, immersive environment that allowed participants to step away from their daily operational duties and focus entirely on skill acquisition and collaborative problem-solving.

A distinctive and crucial feature of the specialized curriculum was the integration of a "Capstone Project" format. Participants were required to develop concrete, data-driven proposals to solve real-world operational challenges within Company A's energy infrastructure business using the specific digital tools they had mastered. The final sessions were attended by company executives, where participants presented these digital solutions and received direct, high-level feedback. This executive engagement served two critical strategic purposes: it validated the practical utility of the training to the leadership team, securing long-term institutional buy-in, and it empowered the employees by demonstrating that their new digital competencies could directly influence strategic decision-making and organizational outcomes. These sessions effectively bridged the gap between top-down strategic mandates and bottom-up operational innovation.

Specifically, diverse and practical proposals were developed through these projects, such as automating on-site inspection reports using low-code tools and improving the accuracy of power demand forecasting through data visualization. These initiatives ensured that theoretical knowledge was immediately converted into tangible operational value.

The effectiveness of these interventions was monitored through a comprehensive post-training questionnaire administered to all 1,500 participants upon completion of the core digital literacy course. Beyond measuring participant satisfaction, the survey aimed to capture qualitative shifts in digital mindset and the perceived relevance of the specific tools provided to their respective daily roles. This longitudinal data collection was instrumental in identifying specific areas where the curriculum needed iterative refinement, ensuring the program remained responsive to the rapidly evolving technological landscape and the unique regulatory and safety constraints of the energy sector.

Crucially, this structured educational framework was never intended to be a standalone or isolated initiative. A common pitfall in large-scale corporate training is the phenomenon of "learning decay," which occurs when new knowledge is not immediately applied to practical tasks or recognized by institutional reward systems. To address this, Company A intentionally operationalized the link between upskilling and long-term career progression. By integrating these newly acquired competencies into a formalized career pathing framework, the company ensured that digital proficiency became a verifiable, rewarded, and permanent professional asset. This strategic transition from transient, workshop-based training to institutionalized professional growth—where digital skill acquisition is woven into the very fabric of an employee's career trajectory—is detailed in the following section and illustrated in Fig. 2.

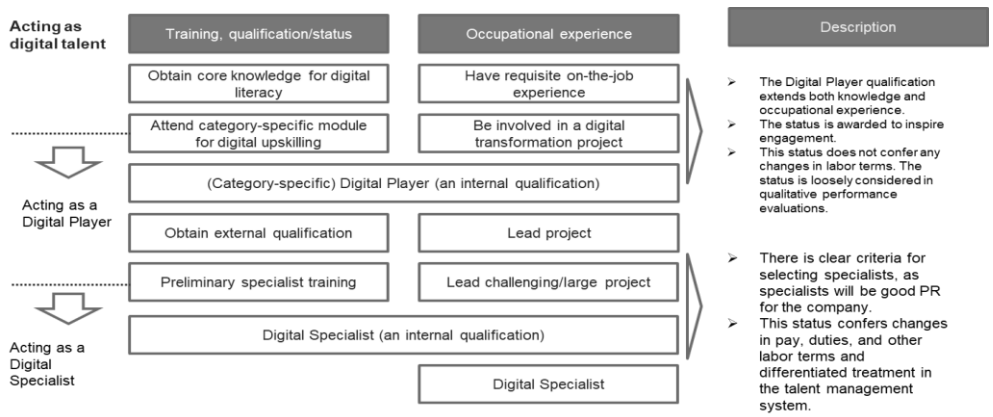

Fig. 2. Digital upskilling and career pathing

To earn the status of Digital Player, employees must, after attending the mandatory core course, complete a category-specific course. They must also obtain the requisite on-the-job experience and participate in a DX-related project. Company A formalized on-the-job experience and project participation as requirements to encourage self-driven learning and initiative-taking. As such, they count toward an employee's personnel evaluation to some extent, although they remain loosely defined so as to encompass a

broad range of talent and motivate the employees. Occupational experience is evaluated under Company A's talent management system, which maintains an internal database of employees' professional growth and initiative-taking.

After obtaining the status of Digital Player, employees can achieve the status of Digital Specialist by obtaining an external qualification related to digital technology or DX (from either Japanese government or a certifying authority outside Japan), by leading a DX-related project, and by attending a preliminary specialist training course. While the preliminary specialist training course is included in the framework, it is not included in the case study analysis because no employees had reached that stage at the time of the analysis.

Digital Player is a status that is awarded to employees to help raise the workforce's overall level of digital literacy. Employees with this status are prioritized in assignments to Company A projects related to DX. Thus, employees can have plenty of opportunities to gain new knowledge and experience, meeting both the employee's and the organization's needs. This status has no firm linkage with personnel evaluations. The status will be taken as a sign that the employee is proactive, but it is only one of the items considered in qualitative personnel evaluations.

The Digital Specialist status indicates expertise in a specific category of digital talent. For example, if an employee has this status in relation to the data scientist category, it means that the employee can organize horizontal collaboration in projects related to internal database building, analytics, and business intelligence. As such, employees of this status will be differentiated in the talent management system; their pay package and evaluation criteria will differ from those of employees who do not have this status. At the time of the analysis, Company A had no Digital Specialist employees, and the exact terms of the status remained subject to discussion with HR. If the pay package is differentiated as planned, this will help the company attract specialist talent in what is known in Japan as "mid-career hiring" (*chuto saiyo*: hiring experienced candidates, as opposed to hiring fresh university graduates in annual recruitment drives).

IV. RESULTS AND DISCUSSION

Fig. 3 shows the results of the questionnaire survey completed by employees after attending the core course on digital literacy. The vertical axis indicates the median score for each questionnaire item (rated on a five-point scale). The sample consists of 351 general staff members and 149 managerial staff members (effective response rate: 95%, n = 500).

All ethical considerations relevant to survey-based research were observed. Participation was voluntary, informed consent was obtained from all respondents, and the survey was administered anonymously without collecting personally identifiable information. All responses were treated confidentially and used solely for academic purposes. As the study did not involve sensitive personal data, it was exempt from formal ethical review.

Employees generally expressed satisfaction with the core course on digital literacy. Some found it too easy, whereas others found it too difficult, which is unsurprising given that the sample, consisting of all employees, varied widely in digital literacy and experience. Notably, the results differed between general and managerial staff. Compared with the managerial staff, the general staff tended to have a stronger comprehension of the content, which may be because they are younger and thus had a stronger grasp of the core knowledge. Meanwhile, the managerial staff had a clearer understanding of how to apply digital technology into business processes, which may be because, with their relatively long years of occupational experience, they had greater insights into the business applications of digital technology.

This pattern was also reflected in the quantitative results. For example, the median score for interest in DX was 4.0 for general staff and 3.4 for managerial staff, indicating a gap of 0.6 points on the five-point scale. By contrast, the median score for perceived applicability of digital technology to business processes was higher among managerial staff than among general staff.

Against this backdrop, the most salient feedback concerns ideas about how the course should be in the future. Managerial staff gave low scores for recommendability to others and interest in DX, suggesting that they may have relatively low acceptance of DX and a strong preference for conventional (non-digitized) business processes. This finding is consistent with earlier studies that have highlighted organizational culture as a barrier to DX. It also underscores the need to design digital upskilling initiatives that explicitly address managerial mindsets rather than focusing solely on frontline employees.

In particular, it indicates that any digital upskilling initiative must be accompanied by efforts to engage middle management, who often play a gatekeeping role in organizational change.

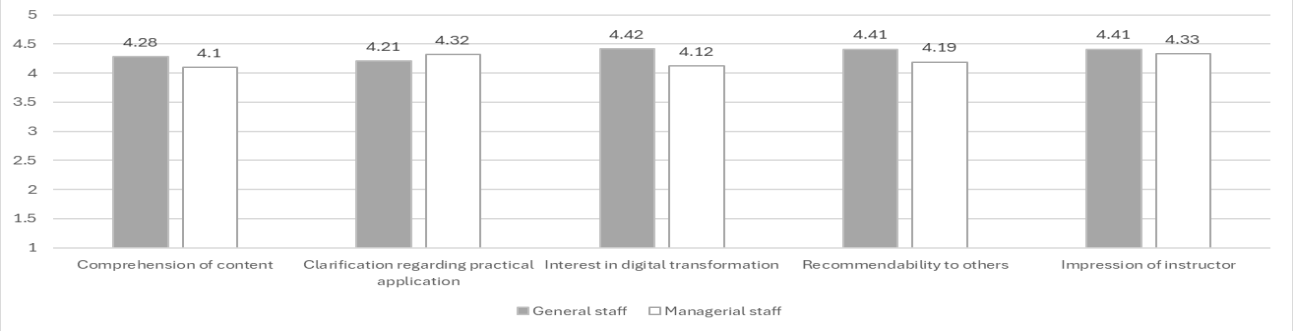

Fig. 3. Median scores for items in the questionnaire completed after attending the core course on digital literacy

The intervention produced ten Digital Players. They were in frontend positions, engaging in transformation/improvement efforts, and assisting with digital integration in the workplace. They were also gaining experience in project implementation, putting them on track to become Digital Specialists. Three months after the intervention, the author interviewed the Digital Players. The feedback from the interviews suggests that the intervention, instead of merely resulting in the acquisition of technical knowledge, inspired the employees to actively engage in transformation efforts. Comments included the following:

I feel committed to a digital transformation that will improve the workplace and deliver added value to customers. (Digital Player 1)

I want to take on the role of improving the reputation of the energy infrastructure sector as a whole. (Digital Player 2)

I never knew that you could learn about digital transformation in this industry. It was fascinating. (Digital Player 3)

When viewed from the perspective that DX is driven by strategy, organizational culture, and changes in employee mindset, these comments are consistent with Kane et al. [5]. At the frontline workplace level, prior studies indicate that younger employees exhibit a strong interest in digital progress and are generally open to adopting new ways of working, as noted by Kane et al. [5]. However, digital progress can be impeded by an ossified organizational culture when a conventional, process-oriented approach continues to dominate organizational practices. In this context, Kane et al. [5] focused on the conditions under which DX can be successfully realized, arguing that "the ability to digitally reimagine the business is determined in large part by a clear digital strategy supported by leaders who foster a culture able to change and invent the new." The way Company A integrated digital upskilling with career pathing offers a best-practice model for such a digital strategy. Sustaining such practice is key to a successful transformation. The case study shows that digital upskilling can help transform the organization's culture, apart from improving digital literacy skills. On the role of organizational culture in DX, Watanabe [6] suggested that this is paramount in determining digital success, reporting that organizational culture and psychological safety are more important than technology is in DX.

Digital Players have a valuable role to play in transforming organizational culture. As frontend workers, they can set positive examples in digital integration and transformation, narrowing the large gap that exists, according to Miyamoto [7], between back-office IT teams and frontend operations (related to construction, logistics, or engineering). This approach also has applicability in companies based outside Japan. Kane et al. [5] emphasized that the success or failure of DX initiatives is driven primarily by organizational culture, leadership, and strategic alignment rather than by technological factors alone. Their findings suggest that challenges related to organizational culture are not confined to a specific national context but are commonly observed across organizations in different countries. Thus, the approach discussed in this study has international applicability.

V. CONCLUSION

Technological innovations driven by DX are rapidly emerging worldwide. However, while the technology may proliferate, it will only deliver benefits if it is applied effectively by the organizations and talent in question. Indeed, digital failure is a risk for any country. When companies are large in size and have a long heritage, it is more difficult to change organizational culture and embrace the innovation that DX entails.

However, as the case study illustrated, every organization will have a contingent of young employees who have high digital sensitivity, and these employees can lead corporate transformations. Organizations will need some intervention to change the organization's culture; the career pathing program seen in this case study is one such intervention. This case study analysis clarified an intervention for transforming organizational culture and nurturing the organization's digital talent.

Nonetheless, the case study represents a single company in Japan. Corporate culture is a product of factors that vary across companies and across countries. When attempting to apply the findings of this case study to organizations outside Japan, it will be necessary to account for the cultural and institutional contexts present in the territory in question. Another issue is that the case study analysis was unable to show how Digital Specialists can positively affect the organization, as no employees had yet gained that status at the time of the analysis. A follow-up study is necessary to obtain findings on the impact of Digital Specialists. Despite these limitations, the approach illustrated by this study has reasonable generalizability as a practical best-practice model for DX. Companies worldwide can use such an intervention to deliver value.

VI. ACKNOWLEDGMENTS

While respecting the anonymity of the company featured in this case study, I wish to acknowledge the many employees who participated in the study. I also wish to thank the management for spending considerable time in designing the upskilling program and career pathing initiative. The findings of this study are a testament to their dedicated efforts.

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