

Future-Proofing the Workforce: A Case Study of Integrated Human Capability Frameworks to Support Business Success

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Abstract—This paper discusses the development of co-designed capability frameworks for two large multinational organizations led by a university department. The aim was to create evidence-based, integrated capability frameworks that could define, identify, and measure human skill capabilities independent of specific work roles. The frameworks capture and cluster human skills required in the workplace and capture their application at various levels of mastery. Identified capability gaps inform targeted learning opportunities for workers to enhance their employability skills. The paper highlights the value of this evidence-based framework development process in capturing, defining, and assessing desired human-focused capabilities for organizational growth and success.

Keywords—Capability framework, human skills, work-integrated learning, credentialing, digital badging.

I. INTRODUCTION

THIS paper discusses the creation of two evidence-based capability frameworks, developed collaboratively with a university department to identify and measure human skill capabilities across various work roles. The success and prosperity of businesses rely on a workforce equipped with a diverse set of human skills or capabilities [1]. While technological advances and automation play a significant role in the fourth industrial revolution, the demand for talented individuals with human skills such as communication, critical thinking, and adaptability is increasing [2], [3]. This paper emphasizes the importance of human capabilities in achieving work engagement, staff satisfaction, and organizational success [4]. It explores the development of integrated capability frameworks that enable organizations to define, measure, and develop human-focused capabilities needed for business success. A case study approach provides insights into the planning and design of these enterprise-wide capability frameworks. These frameworks are supported by an outcome-based credentialing assessment process, ensuring the effective capture and assessment of human skills in the workplace.

The integrated capability frameworks discussed in this paper, guided by evidence-based design principles, successfully capture and cluster the specific human skills required by two large multi-national organizations. The frameworks enable assessment of the application of human skills at four levels of mastery from entry-level worker to senior leader. This provides organizations with a rigorous process to identify capability gaps

and offer targeted learning opportunities to upskill staff at all levels. The use of clear, concise, and measurable capability statements facilitates the assessment and development of capabilities across the four levels of mastery.

The value of an evidence-based human capability framework development process lies in its ability to capture, define, and assess the desired human-focused capabilities necessary for organizational growth and success. The framework enables the measurement of each capability through outcome-based credentialing assessments leading to the award of digital badges that acknowledge individual achievements.

II. LITERATURE REVIEW

Businesses with more capable staff have higher rates of innovation and productivity [5], [6]. Business research and literature indicate a strong relationship between human capital and economic growth [7], [8]. Investment in identifying, development and measuring human capabilities is key to responding to the rapidly changing “world of work” to ensure the workforce is well positioned for future growth and success [8], [9].

Individuals need a range of broad, generic, and transferable “soft” or human skills to work effectively within and across a range of cross-functional roles at various levels of mastery [8]-[10]. Ivaldi et al. [3] highlight one key challenge for the workforce in the current industrial revolution, which is “developing the so-called soft skills, as peculiarly human abilities, which represent the great qualitative difference between man and machine”.

There is an abundance of capability and skills frameworks currently in existence, and most reflect broad agreement across the industry, education, and training sectors regarding the human skills needed by the workforce to thrive [2], [7], [8]. What this paper adds is insight into the development process for an innovative and integrated capability framework that can be used as an enterprise-wide map to not only capture and define the desired human skills, but also provide a process for verifying, measuring, and validating these in the workplace. This process demonstrates current human capabilities at various levels of mastery, enabling the organization to offer targeting learning and development opportunities for human skill capability that are not at the required level, and then reassess to verify skill improvement.

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This approach to capability framework development promotes integrated, flexible, and continuous workplace-based learning by defining, measuring, and developing human capabilities in the workforce. Furthermore, external, or internal outcome-based credentialing assessments are a key part of the framework to measure current capability and provide a flexible, verifiable, stackable, and transferable approach to workforce skill development. According to a recent UNESCO report [9], the acquisition and verification of skills and knowledge relevant to a person's career are key motivators in seeking learning and development opportunities and credentialing can provide verification of capability development. According to Ivaldi et al. [3], for businesses to flourish in the fourth industrial revolution, the workforce must be able to connect, create, and implement innovative ideas in flexible, cross-functional, real, or virtual organizational structures. Abujbara and Worley [11] highlight the increasing importance of human skill development, particularly for leaders, noting that each skill needs to be defined and assessed based on the leaders' behaviors and actions.

There is broad agreement regarding the types of capabilities needed to face the challenges of industry 4.0, with a variety of studies emerging that link competencies into categories such as technical skills, social skills, and human or personal skills [3]. The human skills embedded in the frameworks discussed in this paper are those identified as the most important for future business success [2], [7], [8]. These skills broadly cover communication, professional behaviors, critical thinking, problem-solving, and leading and developing people. Klaus [12] found that 75% of long-term job success depends on these human skills, while technical skills are much less important to overall capability or career progression.

The European Reference Framework of Key Competencies for Lifelong Learning [13] defines the skills needed by European citizens to achieve personal, employment, and social fulfillment. This framework enables individuals to reap the benefits of lifelong learning and remain competitive in the changing world of work. The key human or personal competencies identified are divided into categories such as communication, both in the native tongue and in other languages, mathematical, science, technology, and digital competencies, learning to learn, and social and civic competencies. Social and civic competencies include collaboration, problem-solving, assertiveness, integrity, respect, critical thinking, reflection, and effective decision-making. Marr [14] identifies similar skills, such as creativity, human-to-human communication, emotional intelligence, critical thinking, and complex decision-making. These bear striking similarities to those capabilities identified by The European Reference Framework of Key Competencies for Lifelong Learning [13]. Marr [15] goes on to predict that today's school children will be in jobs that do not currently exist that will require distinctly human skills, such as empathy, creativity, critical thinking, and communication. This author explains that the ability to apply these skills in the workplace, and in life, is vital for future success and well-being.

From the literature, the capabilities required to function

effectively in a flexible, hybrid, knowledge-intensive, technological society are those that make us human and cannot be replicated by machines [3], [15]. It is therefore imperative to create processes to measure and develop the application of these key human skills in the workplace. This enables people to thrive, progress in their careers, achieve organizational objectives, engage with others effectively, and work flexibly [16]. It is also suggested that workplaces are effective learning environments in which people both apply and develop human skills during their everyday workplace activities [17]. However, to do this effectively, organizations must move away from strict hierarchical structures of command and control and promote continuous organizational learning that encourages worker autonomy, innovation, adaptive thinking, and human connection [17].

For businesses to retain a competitive advantage, an integrated process of identifying the human capabilities required by an organization, assessing the presence or absence of these capabilities, and addressing capability deficits with learning opportunities to develop them at various levels of mastery is essential [18]. However, the challenge of assessing and developing capability often falls on individual supervisors during performance review meetings with individuals. This makes it difficult to track and assess capabilities across the workforce and relies on the capacity and ability of supervisors to hold meaningful discussions with staff [18]. There is a growing number of external consultancy and human resource organizations that offer services to help organizations optimize their workforce capability through capability assessments, gap analysis, and learning. However, these tend to be "off-the-self" solutions that are not contextualized to the needs of a specific organization [19]-[21].

The integrated capability frameworks discussed in this paper are tailored to each organization through a co-design process. Once complete, the framework is "owned" by the organization and can be adapted to reflect changing capability priorities in the future. This is achieved by creating an integrated capability framework that enables an organization to define, develop and assess workforce capabilities specific to their goals and needs at varying levels of mastery, from those just beginning in the workforce to senior executives.

Several evidence-based design principles were used in the process of capability framework development, based on the research and literature discussed in this section. These principles ensure that definitions are clear and used to create capability statement scaffolded across the levels of mastery. The capability statements need to be actionable, measurable and resonate with the workforce, so they can be used to assess and upskill workers through targeted development opportunities. The capability statements also drive learning outcomes, enabling an organization to shift from "event-based" learning to continuous learning, a strategy supported in educational research [23]. The capability framework development process includes an outcome-based credentialing component to assess human capabilities against the capability statements. These statements guide individual workers to choose examples of their achievements that clearly demonstrate the application of a

specific human capability at progressively more complex and autonomous levels of mastery. This approach reflects Bersin's [22] 4E framework (experience, exposure, environment, and education) and ensures that the assessment of capability is firmly embedded in measurable capability statements that can be demonstrated using practical examples, rather than solely assessing the acquisition of theoretical knowledge [24].

The capability frameworks discussed in this paper define the level of mastery across human capabilities through dimension statements. These statements reflect the overarching level of mastery by defining the level of complexity, autonomy, and influence expected of a person at each level, regardless of the specific human capabilities being measured. The concept of levels of mastery draws on the work of Benner [25], who built upon the work of Dreyfus and Dreyfus [26] to articulate stages of mastery of skill acquisition. The concept of levels of skills acquisition or mastery is widely applied in education, industry, and workforce development. The identification of dimensional "lenses" explicitly measures not only whether a person can demonstrate application of a human skill capability but also whether they can demonstrate it at the desired level of mastery. This unique feature of the capability frameworks discussed in this paper adds an additional measurable component to the assessment and skill acquisition process, enabling individuals to develop their skills from one level to the next. Each human skill capability needs to be assessed at an increasingly complex level of application, by considering the nature of the problems and responsibilities individuals encounter at various levels within an organization.

The dimensions within the capability frameworks are built using a range of workforce development models, including elements of Stratified Systems Theory [27], the Hay Job Evaluation Classification System [28], and the Dreyfus and Dreyfus model [26]. These models ensure that appropriate levels of complexity, responsibility and accountability are considered when defining and assessing levels of skill mastery and capability.

III. THEORETICAL MODELS

To develop a human capability-based framework, a systems-level strategic approach is required [27], [28]. This is due to the need to view human capabilities as more than mere operational, technical, or occupational skills. Rather, human capabilities address the system-level priorities that underpin the business' medium-to-long-term strategy, culture, agility, and productivity requirements. Consequently, to underpin and form a holistic, verifiable standard, the development of the capability frameworks drew on a range of theoretical models to support the framework design methodology.

First, benchmarking of levels of work was considered using Stratified Systems Theory [27], with a secondary reliance on the work of Benner [25] on mastery levels in nursing and the Dreyfus and Dreyfus [26] model of adult skill acquisition. These models informed the scaffolding approach to non-technical, human capabilities. The use of these theories was intended to ensure that a robust and holistic measurement of capabilities can occur across the spectrum of human skills

through the benchmarking of capability at four levels of mastery [10], while remaining agnostic of job roles, position descriptions, or technical tasks.

The capability frameworks need to articulate cross-functional, multi-disciplinary human attributes that individuals are required to possess to be successful in the work of work, even in roles that do not yet exist, as well as meet agreed business strategic imperatives [9], [15]. Using a scaffolded approach, learners can build on their existing capabilities from one level to the next. The framework provides a process of assessment that enables people to determine where they "sit" in terms of their current capabilities and what they are expected to demonstrate to progress to a higher level of mastery [8].

Outcome-based credentialing is the tool that was chosen to enable measurement of existing human skill capability against agreed statements and dimensions [9]. Any identified 'gaps' in human capabilities can then be addressed by creating targeted learning opportunities that use the capability statements and dimensions as learning outcomes to create capability uplift so that employees can demonstrate a higher level of mastery to meet organizational objectives and progress their careers.

IV. METHOD/APPROACH

The development of the capability frameworks discussed in this paper occurred between 2020 and 2022 in two specific organizational contexts. Both co-design partners were multinational organizations headquartered in Australia, one in the financial sector and the other in the agricultural sector. The number of employees of each was between 23,000 and 28,000, and both had operations in other countries, including New Zealand, the Pacific, UK/Europe, USA, and India. In both cases, the development of the capability frameworks followed a similar process to capture and contextualize the core human skills required by each organization. Each capability framework build was a collaboration between the commercial wing of an Australian University and the organizational partners to develop an integrated capability framework that was "simple, clear, and helped people understand job expectations today and into the future, including how to measure and build mastery" [10]. The organizations sought out the expertise of the university department based on past achievements in developing outcome-based, externally validated credentials over an eight-year period. Three key subject matter experts engaged by the university built the capability frameworks by collaborating with the industry partners to identify relevant human capabilities required within each organization. The university department also had a strong history of collaborating with commercial clients to tailor learning opportunities and capability assessments for their workforce, so the creation of integrated capability frameworks to define, assess, and develop human capabilities was a natural progression.

The process of co-designing the framework commenced with an analysis of relevant educational, business, and workforce literature regarding the key human skill capabilities required to achieve organizational objectives and visions for the future. The literature review informed each organization's desired list of skills identified by the co-design team. In each case, the co-

design team was made up of the three subject matter experts and three to five members of the organizations learning and development and/or human resources departments.

The co-design team worked together to refine and reduce sometimes lengthy lists of human skills to between 10 and 14 core skills by asking questions such as “What is this skill in service of in this organization?” This enabled the co-design team to reflect on the nature and purpose of each skill and to identify linked skills from the extended list and roll these into overarching human capabilities. For example, communication was the overarching capability that captured several linked

skills identified by one organization: writing and speaking, report writing, presenting information, and listening. Similarly, the two skills of inductive and deductive reasoning, plus logical thinking, were rolled up into the core capability of critical thinking.

Table I provides examples of some core human capability definitions that resulted from refining and clustering skills from lengthy organizational skill lists to better capture the intent and overarching focus of each skill capability. The definitions were agreed upon and used to provide clarity regarding what each capability means, regardless of the level of mastery or job role.

TABLE I
 EXAMPLES OF CORE HUMAN CAPABILITY DEFINITIONS (WITH EMBEDDED SKILLS)

| Human Capability (<i>and embedded skills</i>) | Definition |
|---|---|
| Ethics, diversity, and cultural inclusion (<i>encompasses professional behaviors and integrity</i>) | Acts with integrity to role model inclusion, value diversity and encourage sharing of different perspectives, in a local and/or global context. |
| Feedback (<i>encompasses validation, supporting and guiding others</i>) | Gives, seeks, receives, and acts on timely, specific, and constructive feedback. |
| Facilitation (<i>encompasses collaborative engagement and adapting to change</i>) | Brings people together to assist and guide them to move through a process, change or new idea, using a range of techniques to engage with people and achieve desired outcomes. |
| Influencing (<i>encompasses inspiring others to action through persuasion</i>) | Gains commitment of others through a range of persuasion techniques. |
| Drives strategic results (<i>encompasses objective setting and adaptive thinking</i>) | Sets and reviews motivating, adaptive and clear goals (individual/team/business) based on the careful consideration of desired strategic outcomes. |
| Critical thinking (<i>encompassing inductive and deductive reasoning, logical thinking</i>) | Uses logic and reasoning to analyze, evaluate and synthesize a range of information to understand an opportunity or challenge. |
| Emotional Intelligence (<i>encompassing self-awareness social awareness, self-management</i>) | Recognizes own feelings (self-awareness) and those of others (social awareness), motivates self and manages emotions effectively (self-management) when interacting with people. |
| Communication (<i>encompassing writing and speaking, report writing, presenting information, and listening</i>) | Conveys and comprehends information and ideas effectively in both spoken and written formats. |
| Problem solving (<i>encompasses analytical thinking, planning, and implementing workable solutions</i>) | Identifies and critically evaluates interconnections and patterns, for the purpose of finding and implementing effective solutions. |
| Business and financial acumen (<i>encompassing process and workflow design and technology skills</i>) | Analyses data and trends to inform business and financial judgements to adapt approaches and effectively manage change by contributing to positive business processes and outcomes in sometimes uncertain or evolving situations. |
| Learning development design (<i>learning and skill development</i>) | Designs learning experiences and materials in a manner that results in the acquisition and application of capability (skills, knowledge, and experience). |
| Developing and empowering people (<i>encompasses effective leadership and coaching others</i>) | Attracts, selects, and develops the best talent to meet current and future individual and business objectives. |

TABLE II
 EXAMPLES OF CORE HUMAN CAPABILITY STATEMENTS (AT 4 MASTERY LEVELS)

| Capability | Entry-level worker | Proficient Level | Advanced Level | Expert Level |
|---|---|---|--|---|
| Ethics, diversity, and cultural inclusion | Demonstrates integrity, inclusive and ethical practices in line with organizational standards, guidelines, and codes of conduct to deliver defined business outcomes. | Holds self and others accountable for acting with professionalism and integrity to build trust and foster a safe and inclusive working environment to achieve business goals. | Creates a culture of professionalism and integrity by leading initiatives to promote trust and inclusion to achieve departmental and strategic outcomes. | Champions an ethical and inclusive culture through creating and embedding trusting relationships that drive strategic outcomes across the organization. |
| Critical thinking | Uses basic logic and reasoning within defined parameters to evaluate information and understand opportunities or challenges. | Evaluates and analyses information to arrive at workable options in response to opportunities or challenges. | Draws insights from analyzing complex data and information to respond to opportunities or challenges. | Analyses, evaluates, and synthesizes information from multiple data points to respond to strategic opportunities or challenges. |
| Communication | Demonstrates appropriate spoken and written communication styles, and actively listens to promote collaborative interactions. | Shares clear and credible information with others to support meaningful interactions and progress business goals. | Conveys and understands complex information using a range of communication techniques to interact effectively with others to achieve desired outcomes. | Employs sophisticated and effective communication styles to lead, influence, inspire the achievement of organizational goals. |

Once each human capability definition was agreed upon, the next stage of the process was to create clear, meaningful, and measurable capability statements to enable assessment of the application of each skill at four levels of mastery: from foundation or entry-level worker through proficient level to advanced, and finally expert level. These capability levels are also defined by the dimensions, which, as already discussed,

provide the “lens” through which human capability levels of mastery are viewed.

Table II provides some examples of how the definitions are used to inform the assessable capability statements that reflect the four levels of mastery.

As previously discussed, the dimensions reflect overarching attributes required at each level of mastery across all human

capabilities. In the capability frameworks discussed here, these were the dimensions of autonomy, complexity, and influence, and the increasing scope of these dimensions is evident in the capability statements in Table II. However, any other desired overarching attributes, such as professional integrity, respect, or ethical practice, might be relevant across the four levels of mastery, depending on the nature of the business or industry sector. This was an important aspect of the development process because for workers to demonstrate the human skill capabilities at the entry-level, the dimension “lens” needed to identify that they will be working under direction, usually within defined parameters, to apply routine processes and organizational rules to their work, this is evident in the examples of capability statements for entry-level workers provided in Table II. Workers who seek to demonstrate the application of human capabilities at the expert level, as evident in Table II, would be expected to demonstrate that they are highly autonomous and self-directed, work in complex multi-faceted roles, direct others, and set, support, guide, and role model desired organizational behaviors and standards to achieve strategic goals.

V. DISCUSSION AND RESULTS

The outcomes of developing these capability frameworks were threefold: first, the process provided a means of defining the human capabilities and dimensions required by each organization; second, these were operationalized into clear, concise, and measurable capability statements, nuanced to reflect what each organization would expect to observe at four levels of mastery; and third, the measurement of existing capabilities and the identification of any gaps informed the development of learning opportunities aligned to each capability at each level of mastery to create capability uplift and enhance performance.

The core purpose of these frameworks was to enable each organization to define, map, assess and reward existing capabilities and design targeted learning opportunities to further develop the required human skills capabilities. This process gave workers a clear pathway of human capability development and career progression. Using evidence-based design principles, clear and measurable capability statements and dimensions that reflected the level of mastery, as well as outcome-based credentialing, these capability frameworks provide a navigable map for organizations to use to measure existing workforce human capabilities, recognize achievements with digital badges, and provide tailored learning and development to address any skill gaps. In addition, the capability statements can underpin key selection criteria during the selection process, and inform performance review and goal setting conversations. In this way, workers seeking to progress their careers in the organization undertake an externally or internally administered assessment, or even a self-test, to confirm their current capabilities and level of mastery. External assessment provides a more rigorous process of identifying ability and a digital badge is awarded which contains metadata about an individual’s achievements. The digital badges are verifiable, portable, and underpinned by specific information

about the capability, to provide an enduring acknowledgment of an individual’s human skills [20].

The responsibility of an external digital badge issuer is to create a digital badging program that reflects the value of the earner’s award and cannot be tampered with [29]. Organizations need to carefully consider the architecture that will underpin the digital badging program if they want these badges to have value in the workplace and acknowledge workers’ human capability achievements. Digital badges can be a powerful incentive to encourage lifelong learning and capability uplift.

The organizations discussed in this paper made the decision to award internally generated digital badges for achievements at the entry level, using a similar but more streamlined and more cost-effective assessment process to externally validated badges. This decision was to enable the organization to assess entry-level human capabilities at scale and create effective learning opportunities to upskill workers in areas that were lacking. The human skill capabilities at the three higher levels of mastery are assessed externally and digital badges issued to acknowledge achievements, these have value within and outside the organization. These badges also reflect achievements can be used to articulate into a range of university qualifications if so desired.

VI. CONCLUSIONS

This paper has shared an innovative and integrated process for developing evidence-based, bespoke human capability frameworks to identify, measure, and develop human capabilities, design tailored organizational learning, and celebrate achievements. As highlighted in the literature review, many organizations have adopted capability frameworks to inform performance reviews and organizational learning. However, the integrated frameworks discussed here provide a mechanism for not only defining the desired human capabilities required by specific organizations, but also for measuring and assessing their application at four levels of mastery, to enable the development of targeted learning opportunities to build human capability. The assessment of capability using outcome-based credentialing and the issuing of digital badges incentivizes the development of core human skill capabilities needed for business success in the fourth industrial revolution. The future of work requires individuals who can develop and demonstrate a range of human capabilities that allow them to adapt, flex and adjust to new roles and new ways of working [3].

The development processes described in this paper were the result of collaborations between a university and various organizations, using an innovative co-design process based on evidence drawn from relevant literature [1], [4], [7], [9], [13]. This has resulted in the creation of capability frameworks that are flexible, role agnostic, scalable, and credible.

As new human capabilities are required by organizations to meet future objectives, these can be integrated into the framework using the same processes to define them, create measurable capability statements and dimensions, as well as use these to recruit staff, provide focused learning opportunities,

and recognize and reward the effective application of human capabilities in context [14]-[18].

It is also important to note that these frameworks are not designed to recognize or reward learning per se but rather the application of skills in the workplace at the identified level of mastery [25]-[28]. Learning opportunities underpinned by the capability framework, draw on the capability statements and dimensions to form learning objectives; learning can then be assessed by the demonstration of capability in the workplace through workers identifying specific examples (with supporting evidence) of when and how they have applied these human skills [10].

There were some challenges faced by the project team that resulted in several “lessons learned” throughout these framework builds. These were all related to the process of identifying, defining, and refining the list of human skills each organization required. Until each human capability was defined, it was challenging to create clear, concise, and measurable capability statements for each level of mastery. In one instance, this process became convoluted as the co-design teams did not initially undertake a phased process of first agreeing on definitions before developing capability statements and dimensions. This resulted in the teams repeatedly going backward and forwards to amend definitions and capability statements, so they were linked and aligned. It was also sometimes challenging to develop clear and measurable capability statements that were not too complex while still capturing the essence of each at the required level, but the teams got better at this part of the process over time.

The limitations of this study are that only the development process of the capability frameworks is discussed, as a full evaluation of the impact of these frameworks on assessing and uplifting workforce human capability has yet to be completed. The implementation of the frameworks in each organization is a phased process over several years. Therefore, much more work is required to evaluate the implementation outcomes.

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