

Original research article

The mental and physical wellbeing flow within the People Value Stream

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Abstract: The aim of this paper is to consider the mental and physical wellbeing of employees through a lean-inspired People Value Stream lens. Poor well-being is a major cause of reduced productivity for organisations and a drain on healthcare services. We develop a conceptual approach as to how the interrelated spheres of mental and physical health might be dramatically improved through the lean, proactive intervention of employees. This requires the creation of a self-reliant wellness approach by focusing on an individual's meaning and goals and their consequent overall wellness and motivation. This involves assessing their mental and physical 'flow' during their career and how individuals can take control of their own wellbeing with the support of their team and wider organisation. Attention to this flow will help employees achieve what they want more quickly and effectively, with consequent benefits to their team and the organisation. We show how this can be achieved from a conceptual point of view and with a practical example. This is the first flow to be considered in detail within the People Value Stream approach. This provides a framework to completely rethink mental and physical wellbeing from the viewpoint of the individual rather than the organisation.

Keywords: People Value Stream; mental health; physical health; wellbeing; lean

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1. Introduction

Many companies regard their 'people as their greatest asset' (Hafey^[1]). However, the majority of attention within improvement methodologies, such as lean, has traditionally been devoted to the technical side of improvement, often from an industrial engineering point of view (Monden^[2]). The lean approach is based on the elimination of waste (*muda*), reduction of variation (*mura*), and removal of overburden on the employee (*muri*). According to the classic 'Lean Thinking' book (Womack & Jones^[3]), it also relies on 5 principles, namely: value from the eyes of the customer, a focus on improving the *value stream* (the end-to-end information and physical movement within the order fulfilment process), *flow* (removing impediments to the seamless movement in the value stream typically by employing a 'plan for every part' and 'single piece flow'), *pull* (fulfilling real orders as required by the customer rather than producing goods and services to forecast) and *perfection* (continually improving).

Due to the technical approach that has typically been employed, the role of people has often been ignored or downplayed, meaning that the overburden placed upon them may not have been adequately addressed

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(Emiliani^[4]). The purpose of this paper is to reveal a different way to consider how to optimise people's contributions by optimising their mental and physical wellbeing. As discussed below, traditional lean implementation therefore has a somewhat debatable impact on people's mental and physical wellbeing.

There has been more emphasis on the various sides of lean in the current century, such as respect for people^[5,6], learning^[7,8], leadership^[4,9] and behaviour^[10,11]. The lean approach has typically been applied in the operations or supply chain areas of organisations, although there are a few recent examples of the application of lean (or an allied improvement approach such as lean six sigma or agile) within human resources^[12–16]. However, there has been little attention paid to the mental and physical wellbeing of employees from a lean perspective. There have been a number of calls for greater focus in this area:

- Due to the potential negative wellbeing impacts of lean^[17,18].
- How can a worker-centered approach be used to improve musculoskeletal and mental health problems^[19].
- How a self-reported approach might be employed to reduce stress-related disorders at work^[20]).
- How a lean approach might be used to "decrease the suffering and improve the functioning of individuals with mental health disorders"^[21]).
- How lean might be employed to improve ergonomic practices^[22,23].
- The conflicts between ergonomics and production and the partnership dimensions between the employee and employer^[24].
- The need to identify musculoskeletal disorders (MSD) and a focus on preventative strategies and how improvements in this area can be seen within an integrated management system^[25].

Indeed, Yazdani et al.^[25] have suggested that the "disconnected nature of lean projects means that improvements are largely unmaintainable and can be costly in terms of financial, human, and organizational resources". Hence, we have every sympathy for Neumann and Village^[26] view that areas impacting human wellness are so far on the periphery that we are dealing with 'organizational sidecars'.

A number of researchers have suggested that the application of lean itself can have a positive impact on health-related outcomes through greater autonomy^[27], job enrichment^[28], empowerment^[29] and involvement and learning^[30,31]. However, others caution about possible negative aspects due to greater demands and work pressures on employees^[32,33] leading to both mental and physical issues^[34]. Bearing in mind that there are potentially both positive and negative effects of working within a lean environment, we clearly see that it is critical to maximise the positive impacts and mitigate against the negative impacts during employees' careers.

One of the few contributions to the subject of lean and wellbeing is de Koeijer et al.^[35]. They suggest looking at three dimensions of wellbeing: health, happiness, and trusting relationships. A wider definition of wellbeing might be seen to include social, emotional, physical, and financial wellbeing^[36]. In this current conceptual paper, we will extend the People Value Stream approach^[14,15] where the focus on wider wellness areas of happiness, social, and financial are achieved through the creation of meaning for the individual, and then an ongoing self-reliant flow approach is developed by and for the individual throughout their career rather than more traditional top-down or HR-led wellness programmes^[37]. Wellbeing was once regarded as the preserve of HR and considered to have intangible links to business results. The impacts of poor mental and physical health, compounded by the impacts of the COVID-19 pandemic and the ensuing uncertainty, make employee wellbeing firmly established as an essential leadership concern.

The focus on wellbeing is not a recent concept, but it has its foundations in Plato and Aristotle, with the concept of 'epistemic humility' and the link between wisdom and happiness. Employees need a nourishing environment if they are to flourish. Seligman^[38] identified five components (PERMA—Positive emotion, Engagement, Relationships, Meaning, Accomplishments), representing both eudemonic and hedonic, that

people pursue because they are intrinsically motivating and contribute to wellbeing. There is an inherent link between flourishing and well-being.

Without this nourishing environment, employees will be present but not contributing their best, and presenteeism, or *quiet quitting*, can occur where employees in effect impose self-imposed 'work to rule' which in many ways can make matters worse for them^[39]. This imposes a huge cost on the organisation. There are also costs related to lost opportunities. Think of customers who don't have their needs met, followed by stressed employees who simply don't care^[40].

There are a number of benefits from this wellbeing flow^[36]:

- Healthy employees are less likely to take time off work without reason.
- Employees who manage their stress levels experience less burnout.
- Employees who practice physical and mental wellbeing have higher energy levels, leading to increased productivity.
- Employees who feel supported by their employer are likely to be more loyal and stay with the company longer.

Mental health is a huge problem in modern economies. The UK government commissioned research that calculated that 300,000 people lose their jobs annually in the UK due to mental health issues, with around 15% of people at work having symptoms of an existing mental health condition^[41]. They show that this has an annual cost to employers of £33–£42 billion, and an additional cost to the government of £24–£27 billion. On a more personal level, Perkbox^[36] found that 79% of 1815 British adults in employment surveyed commonly experience work-related stress, and that this is the most common type of stress in the UK. These effects have been compounded during the COVID-19 pandemic^[42] and the recent cost of living crisis^[43].

According to Cartwright & Cooper^[44], Benson^[45], Cortina et al.^[46], Neuman^[47], Ray^[48], Spector^[49] and Wojcik^[50] workplace stress is recognised as a key contributor in 75% to 90% of all primary-care doctor visits. The longer these stress responses persist, the more damage they do to one's health. In the short term, stress leads to stomach disorders, back pain, musculoskeletal problems, headaches, skin problems, loss of sleep and energy, and emotional distress. According to Carney^[51], if stress persists over the long term, it can lead to heart disease. People with a low level of control over their work, whether actual or perceived, will trigger the fight or flight response, with the ensuing impact that men who feel little or no control over their work are 50% more likely to develop heart disease and 100% for women^[52]. Hence, mental and physical health issues are highly intertwined.

The impact of poor physical health is similarly daunting. UK government estimates show that, in 2018/19, approximately 581,000 workers were injured in workplace accidents, and the UK lost 28.2 million working days due to work-related ill health in the same period^[53]. A recent survey conducted by the UK Health and Safety Executive^[54] indicated some worrying trends with regards to the prioritisation of work over wellbeing, with the average British worker having worked more than four days whilst genuinely ill in the previous year, and over half of UK employees (52%) admitting to delaying seeking medical advice because they didn't want to take time off work.

2. Creating a state of wellbeing

The evolution of Lean has been well recorded elsewhere^[7,55–59]. What can be seen is that there has been a trend to focus on implementation tools up to around the mid-1990s. After that, there was an increasing focus on whole systems such as Order Fulfilment^[60], New Product Development^[61], Strategy Deployment, Supply

Chain Management^[62], and Total Productive Maintenance^[63]. The Lean community really only started to pay greater attention to the culture and human aspects of Lean in the current century. Indeed, Magnani et al.^[64] report that over half of the papers on the human dimension of Lean were published since 2013.



Figure 1. The People Value Stream Future State^[15].

In the paper "Human Centred Lean", Hines^[14] explores the concept of the People Value Stream (**Figure 1**). For the People Value Stream approach to be successful, the most important area is to help employees understand what they want, convey this 'voice of the employee, and develop a path to achieving it. This involves them flowing (in a similar way to goods or services in a Product Value Stream) throughout their career. One of these flows is that of mental and physical well-being. These flows are designed to be employed in the lean sense of 'flow' (to remove impediments to seamless movement) as well as Mihaly Csikszentmihalyi's^[65] psychological sense of 'personal flow' (a state of mind in which a person becomes fully immersed in an activity and is using their skills to the maximum in order to achieve an optimum experience). Hence, attention to the flows will help employees achieve what they want both more quickly and more effectively. A key output of this is a happier employee who stays longer and adds more value with less wasted human potential^[14]. The mental and physical wellbeing flow will have the largest impact on employee wellness as it creates a self-developed 'plan for every person' and a customised self-delivered 'single person flow'.

The concepts in Human Centred Lean^[15] are expanded upon in the follow-on work "Turning the Lean World Upside Down"^[15] which explores the levels of organisational maturity from the 'traditional approach' to the 'classic Lean approach' to the 'People Value Stream' approach. The leadership style shifts through these different levels from 'transactional leadership' to 'transformational leadership' through to 'servant or coaching leadership'.

This latter approach is based on the needs of the individual employee with a bottom-up management approach, although it does not ignore wider considerations. Clear examples of this approach are understanding the voice of the employee, developing individual growth and development plans, and providing a good deal of leader support to help enable these to be realised. We might liken this to an adult-adult relationship^[66]. Autonomy is created for the employee, with leaders providing support. This is in contrast to some of the literature on servant leadership, which favours a more paternalistic approach^[67].

In this paper, we will adopt the People Value Stream approach and argue that it is important to create a positive psychological environment^[38] for this to be effective. This environment should take into account the needs of the organisation, but fundamentally start with the needs of the individuals within it. In other words, the starting point should be the meaning and subsequent voice of the employee and how employees might be encouraged to be self-reliant, purposeful, and highly engaged^[68]. Borrowing Ryan and Deci's self-determination theory, when this is successfully achieved, people "are agentic and inspired, striving to learn; extend themselves; master new skills; and apply talents responsibly"^[69].

Self-Determination Theory therefore involves "the investigation of people's inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as the processes that foster those positive processes"^[69]. They identified three such needs: competence, relatedness, and autonomy, which "appear to be essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal wellbeing"^[69].

The essence of the People Value Stream approach is therefore the self-development and growth of the individual with the support of leadership and the people and culture team.

3. Lean, healthcare and wellbeing

Lean approaches have been applied widely in healthcare since the early 2000s^[35,70–72]. However, there has been less attention paid to the effect of lean on the health of employees. There appears to be a divergence of views. At an overview level, Rampasso et al.^[71] summarise the number of citations of different negative impacts of Lean on employees' health and welfare (**Figure 2**). Conti et al.^[73] identify 11 practices that are potentially hazardous to occupational stress, with Koukoulaki^[17] also suggesting that practices associated with 'just in time' are conducive to employees suffering from stress. In contrast, Forza^[74] suggests there may be a positive aspect of leaning on stress.



Figure 2. Number of Citations of Problems Associated with Employees' Health & Welfare Caused by Lean Projects^[71]

A similar position emerges with regards to musculoskeletal health with Wells et al.^[75] focusing on the importance of breaks, which might be eroded through lean line balancing activities. Chan et al.^[76] also points out the negative aspects associated with repetitive work and Cullinane et al.^[77] suggesting increased fatigue

levels. In contrast, a number of authors suggest that when ergonomics is integrated in a lean transformation there can be a reduction in absenteeism^[78] and improved working conditions^[79]. Galante^[80] also points out that lean can reduce wasteful material handling movements and similarly Miguez^[81] demonstrate improvements in health and worker safety.

A resolution to the debate may revolve around the maturity of improvement activity with Conti et al.^[73] suggesting a non-linear relationship. Intuitively, this might appear sensible as through the early stages of improvement, lean is often 'done to' employees through top down initiatives and/or improvements driven by specialists such as lean coaches. The targets of these are likely to be around typical lag measures such as improvements in productivity, quality and delivery. During this phase we might expect a negative impact on mental health due to the stress caused through work intensification and the expectations of employees doing improvement 'as well as their day job'.

However, as organisation's mature, they may involve employees more, so that more human focused lead indicators of employee wellbeing such as mental and physical wellbeing are taken into account. This would align closely with the Toyota 'Respect for People' maxim or what Monden^[2] described as 'Respect for Humanity'. In this later period stress might be reduced as there might be more employee involvement, enlightened leadership and hence employee acceptance within the classic Lewin change curve^[82]. We might also suggest that that improvement here might be 'pulled' by the individual or team with a greater focus on safety and ergonomics with the possibility of improving health. This U-shaped relationship has recently been confirmed in Stimec and Grima's^[83] empirical studies of lean and occupational health. In their work they confirm the view of Conti et al.^[73] that within lean health levels can return to near pre-lean levels. However, the question remains as to how we might actually go on to improve mental and physical wellness.

The Mental & Physical Wellbeing flow is designed to enable individuals to develop their personal meaning and wellness throughout their lifetime through the proactive improvement of all aspects of their health supported by their team and the wider leadership of their organisation. Following the approach presented by Hines et al.^[15] we will show how the area of Mental & Physical Wellbeing might be developed from the Stage 1, Traditional Organisation, through the Stage 2 Classic Lean Organisation to the stage 3, People Value Stream Organisation.

4. Conceptual approach: Stages of maturity

The characteristics of the three organisational maturity stages are shown in **Table 1** and follows Hines et al.^[15] and will be described below.

Table 1. Characteristics of organisation maturity stages.							
	Classification	Predominant characteristic	Leadership style	Trust & psychological safety	Continuous improvement approach	Primary motivation	Development & personal growth
Stage 1	Traditional Organisation	Compliance	Tell & direct	Low	Checking compliance to standards	Extrinsic	Limited to Senior Leaders
Stage 2	Classic Lean Organisation	Sporadic engagement	Delegation	Medium	Effort to engage employee within carefully defined parameters	Mixture of extrinsic and intrinsic	Classroom based with Managers and Subject Matter Experts
Stage 3	People Value Stream Organisation	Co-creation	Coaching & empowerment	High	Lead by all and 'pull' on Lean tools as required	Intrinsic	Includes whole workforce who pull both formal and informal learning

Table 1. Characteristics of organisation maturity stages.

4.1. Stage 1: Traditional approach

In the Stage 1 organisation, the approach is typically based on the application of minimum standards, where activities are primarily undertaken by specialists from functions such as Safety, Health and Environment (SHE) to comply with legislation. Hafey^[1] notes: "Leaders focus on safety because it is the right thing to do or because they are forced to focus by an external influence such as OSHA global business demands, their customers, or serious injuries or deaths that occur in the company." Here we are therefore often dealing with failure management, borrowing from the classic Prevention, Appraisal, Failure (PAF) 'Cost of Quality' thinking^[84]. This is usually based on lag measures such as the number of accidents or the percentage absentee rate. There is typically little involvement of local individuals with activities 'pushed' onto them. This approach "relies upon fear and intimidation to help ensure compliance"^[1].

This "natural order of things", where managers tell and direct, emerged during the Industrial Revolution, when most workers were illiterate, and aligns with McGregor's^[85] Theory X's assumptions that the average person has an inherent dislike of work and will avoid it if (s)he can, thus requiring a hierarchy of managers to control, plan, organise and lead^[86]. In these 'Command and Control' organisations, empowerment and autonomy sit with senior leaders and subject-matter experts (SMEs). In a militaristic fashion, they impose deadlines, determine strategy, and are target driven, focused on output and productivity. Employees are regarded as 'resources', and the legacy of Taylorism persists, despite the nature of much work having shifted to a knowledge economy. As expounded by Taylor^[87] in his seminal work, 'The Principles of Scientific Management', employees are seen as motivated primarily by extrinsic rewards, notably money. This transactional style of management is characterised by low levels of trust, high levels of loneliness, and alienation at work. As well as being an undesirable experience in itself, chronic loneliness increases the risk of mental and physical ill-health, premature mortality, increased health care use, and societal costs, with an estimated cost to UK employers of £2.5 billion every year^[88].

These "companies spend their time telling workers how to do their jobs. This has two consequences. The first is that you end up judging employees by everything except what counts, which is whether the job gets done and the customer is happy. The second is that it becomes difficult, if not impossible, to change any of the myriad rules about how to get things done. The result is that it becomes impossible to get the work done without disobeying somebody in the chain of command"^[51]. In these organisations, development and personal growth are restricted to senior leaders and subject matter experts, with a task focus for the wider workforce. Continuous Improvement (CI) is focused on checking compliance with standards, with a dominance of certain voices—position and rank carry more authority than knowledge. "Good ideas die every day' in command-and-control companies. Asked whether their current job 'brings out their most creative ideas', only 17% of those 'not engaged' and 3% of 'actively disengaged' employees answered affirmatively. These two groups of employees make up 73% of the American workforce."^[51].

4.2. Stage 2: Classic lean organisations

In the Stage 2 organisation, activities are either undertaken by specialists or leaders and tend to be periodic or event-based, such as a monthly safety walk or annual health check. Here there is a move beyond mere compliance towards appraisal management (within the PAF terminology), although activities still tend to be 'pushed' onto individuals, such as employee risk assessments, ergonomic assessments, or safety walks, often through an event or short-term project approach dislocated from the general management system^[19,25]. This is usually based on lead measures such as the number of near misses, the number of safety walks undertaken, or the percentage of physical (and sometimes mental) health first aiders. Winkel et al.^[24] have suggested that

occupational musculoskeletal and mental disorders cannot be properly reduced by this kind of approach. The key to correcting this is in the better engagement of employees, as we will explore in Stage 3^[1].

The organisation has started to evolve, and pockets of the population, such as managers and experts, have been empowered. As a result, there is a disparity in levels of equality, trust, and psychological safety, meaning that many in the wider workforce do not feel an alignment between their personal values and the organisation's. The predominant management style is delegation, with 'carrot and stick' rewards and sanctions. Leaders recognise there are benefits to soliciting input from the wider workforce, and this is management-led, using 'Kata style' coaching, focused on organisational targets, and using formulaic style questions, with input sought only in very specific areas^[89].

Employees are invited to participate in problem-solving activities, but their voice often does not carry as much weight as that of a leader/expert: "many traditional bureaucracies have to rely on innovation 'heroes' or on special 'creativity' programmes and platforms to ensure that ideas are heard"^[51]. As a result, there may be low stress among some team members who are not challenged to grow and develop, leading to apathy, boredom, and disengagement. In others, there may be more stress to do things better or come up with ideas. This may also be accompanied by negative physical issues as work pace is increased as 'waste' (or in-cycle rest periods) are reduced.

This is in contrast to the high levels of burnout among front-line leaders, who often feel CI is an addition to their job rather than a system and philosophy to achieve their targets and engage all team members.

Personal development is event-based and does not always translate into on-the-job performance, as it would using a model such as 70/20/10^[90]. Employee development is typically focused on organisational needs linked to strategy and vision rather than individual preferences. The leaders recognise that bringing the collective intelligence of the whole workforce is vital, but they benchmark systems and processes with the best performing organisations, missing the vital culture piece, which means that their results are often below potential and suffer from sustainability issues^[91].

4.3. Stage 3: People Value Stream

In Stage 3 organisations, there is a move to prevention management and self-reliance by the individuals themselves (and their respective teams) in terms of identifying opportunities for improvement of their mental or physical health, seeking approaches to make such improvements, and 'pulling' support from leaders and other support specialists. This is a far more psychologically positive position as it allows for autonomy, competence, and relatedness^[69] as well as the possibility of job crafting^[92], all of which increase motivation. This is far from saying that leaders are passive in that they have got to undertake a great deal of work to enable this to happen and, through specialists such as those in safety, health, and environment, create the infrastructure whereby individuals can become self-reliant and highly motivated.

Leaders in the People Value Stream environment exhibit high levels of emotional intelligence, and there are high levels of psychological safety across the organisation^[93], which is consciously built into all systems and practices. As a result of this, and the coaching style of leaders, there are high levels of employee engagement and autonomy. "As far back as 1924, William L. McKnight, the legendary CEO of 3M, put the matter succinctly: 'If you put fences around people, you get sheep. Give people the room they need"^[51]. Authority and responsibility are devolved to the most appropriate level, and leaders create an environment of co-creation of goals, targets, and how they will be achieved. There is therefore a congruence between the individual and the organisation^[94].

Meetings are co-facilitated by the leader and the team, and gemba walks are an opportunity to listen and learn using appreciative inquiry^[95] and a coaching approach based on the needs of the individual, helping team members to develop and grow. Southwest Airlines, for example, regards their frontline supervisors as the most influential leaders in the company and has the "highest supervisor-to-employee ratio in the industry, which enables supervisors to take on a 'player-coach' role"^[96]. At firms like FAVI, teams approve candidates for the leader's role^[97].

Employees feel a sense of belonging to the organisation and a sense that it is safe, permitted, and desired for them to bring their 'whole selves' to work, and the leaders work to create an environment where people can belong and flourish. "Stop trying to motivate people. That's right. Instead, build an environment that allows people to grow and self-direct—and let them motivate themselves. If they understand the vision, they'll take care of the rest if you let them."^[51]. The psychological contract is deeper, related to values and behaviours and an alignment between the individual and the organisation, both at the 'home team' level and the organisation as a whole.

This flourishing environment is good for the individual and the organisation—employees are intrinsically motivated and often go 'the extra mile' for no ostensible reward. There are high levels of innovation and problem-solving, with employees having the permission and expectation to challenge themselves. There is an inherently higher level of mental and physical wellbeing.

5. Conceptual model: Mental and physical wellbeing in the People Value Stream

We will now explore how mental and physical wellbeing can be enhanced in the People Value Stream Stage. In this section, we will look at the conceptual model before illustrating how it might be employed. This is based on the needs of each and every employee and hence involves a modification of classic lean thinking to create a 'plan for every person' within customised and a self-delivered 'single person flow'. The focus is on the self-development and growth of the individual with the support of leadership, peers, and the people and culture team. Specifically, we will address the Mental & Physical Wellbeing flow of the seven flows illustrated in **Figure 1**. This allows for a more positive approach to areas such as occupational musculoskeletal and mental disorders^[24].

The Mental & Physical Wellness Model presented here is an 'inside out' approach, starting with the inner meaning of the individual, identifying the areas that need to be developed and amplified in the individual's personal flow, and then identifying the support that is required by the wider team leader and team, as well as the systems and structure that are required at the organisational level to enable this to be effective. This mirrors the perspective of Mann^[11] that Leader Standard Work should be layered from the bottom up. The outline for this is shown in **Figure 3**, with the details provided in **Table 2**.



Figure 3. Mental & physical wellbeing model.

Table 2. Themes within the mental	& physical	wellbeing model.
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Theme	Individual level	Team level	Team level leadership	Team level support	Organisational level
Meaning	Personal purpose	-	-	Tier zero buddy	Meaning planning
	Personal life goals	-	-	Tier zero buddy	Meaning planning
	Organisational goals	-	-	Strategy deployment coaching	Organisational strategy
	Personal beliefs	-	Team belonging	Tier zero buddy	Meaning planning
	Organisational beliefs	-	Team belonging	Behavioural deployment coaching	Organisational principles and values
	Personal KPIs and KBIs	-	Team KPIs and KBIs	-	Organisation KPIs and KBIs
Autonomy	Plan for every person	-	Emotional intelligence	-	Employee journey mapping
	Tier zero management	-	-	Tier Zero Buddy	-
	Job crafting	-	Job crafting co-creation	-	Job crafting
	Personal learning plan	-	-	Pull-based learning	Lifelong learning for all
Connection & inclusion	Identifying personal interests and formal and informal peer networks	Team formal and informal Social Activity	Team belonging	-	Social interest groups
	Valuing difference and space	-	Emotional intelligence	-	DEIB practices and communities
	Supportive of others & asking for help	-	Emotional intelligence	Support coaching	Mental health first aiders
	Recognising others	-	-	Team leader and team recognition	Organisational recognition
Stress	Understanding optimum stress	-	-	Stress balancing and support within the team	Crash-out room and resilience training
	Planning work & taking rests	-	Daily work design & planning (rest and restore)	-	Crash-out room
	Developing self- reliance	-	-	Self reliance coaching	-

Theme	Individual level	Team level	Team level leadership	Team level support	Organisational level
Safety	Behavioural based safety	Watch out for others	Lead KPIs and KBIs	-	Behavioural based safety
	Individual hazard analysis/elimination	Watch out for others	-	-	Site mental & physical map/physical first aiders
	Work life balance	-	-	Mutual work-life support	Flexibility and work life balance
Ergonomics	Individual ergonomic analysis/elimination	-	-	ErgoVSM	Site mental & physical map
	Planning work & taking rests	-	Daily work design & planning (rest and restore)	-	Workplace design
Physical fitness	Healthy lifestyle	-	-	-	Site or local community activities
	Taking exercise (Apple watch)	Start-up exercises	-	-	Site or local community activities

Table 2. (Continued).

Deployment of the Mental & Physical Wellbeing flow relies upon the "Self-Development & Growth Cycle" of Hines et al.^[15] which is a feeling-based version of the classic Plan, Do, Check, Act (PDCA) thinkingbased process improvement cycle^[98,99]. This is a type of self-reliant management system based on processing in our limbic brains, which governs our feelings and emotions^[100]. There are four elements of the feeling-based cycle: meaning (~Plan), flow (~Do), reflection (~Check), and action (**Figure 4**). Meaning is defined at the individual level; flow and reflection also occur at the individual level and are supported by the individual's act or pull for support from the team or organisational level.



Figure 4. The self-development & growth cycle^[15].

5.1. Personal meaning and support

The starting point for the development of mental and physical wellbeing is to create meaning for every individual (**Figure 5**). Creating meaning for our people is the first step in increasing their self-reliance, ensuring an improved employee experience, and achieving greater happiness^[101]. It serves two psychological needs: competence and connection^[102]. As a result, employees take more interest in their job^[103], thus positively impacting their engagement^[104]. Meaning for the individual is based on two parts: purpose and belief^[15]. Both of these are important in their own way for the development, growth, and wellbeing of the individual.

The meaningfulness of work was first widely discussed by Hackman and Oldham^[105] in their Job Characteristics Model, where jobs designed for employees were likely to be meaningful (and hence contribute to internal motivation) if they had high skill variety, task identity, and task significance. However, here we are

more concerned with jobs shaped by employees to improve both their mental and physical wellbeing^[106]. Employees require meaningfulness in their work, responsibility for the outcomes of their work, and knowledge of the results of their work activities. We see meaning as the extent to which a person experiences his or her life as having purpose, significance, and coherence^[107]. We also see meaning as forward-looking, changeable, and dynamic^[92], and that the individual needs to have the belief that their purpose is possible to be achieved.



Figure 5. The component of meaning^[15].

5.1.1. Purpose

By purpose, we mean the aspirations that motivate our activities^[108]. Within the People Value Stream organisation, purpose relates to the individual themselves and their role in the organisation. The first are those elements intrinsic to the individual, and the second are those extrinsic to the individual but internalised so that they feel ownership. We will look at the intrinsic purpose first.

This is the personal life goal(s) that an individual might have that may or may not be connected to the workplace. These life goals are something beyond the day-to-day achievement of tasks and are personal to the individual. The process of setting these goals directs our attention to the why, how, and what of our aspirations^[109], as well as the timescale to create positive pressure or eustress^[110]. They allow us targets from which we can feel a great sense of achievement having reached them, and indeed happiness in striving for them, according to eudaimonic wellbeing research^[111].

These life goals are based on our perception of our inner strengths, passions, and values. All of these are based on positive attributes rather than negative ones. The strength-based approach has its roots in social work and is focused on building determination^[112]. Strengths refer to a series of attributes where individuals see themselves as resourceful and resilient when they are faced with adverse conditions^[113]. Again, the approach is positive in nature and led by the individual, not the organisation. It is about helping them see themselves at their very best and capitalising on this for their benefit. It is also, again, about getting people to affect change themselves.

It is reported in the literature that leveraging such strengths is highly positive, as it can increase our confidence^[114], engagement^[115], and health and life satisfaction^[116]. According to Locke's goal-setting theory, the goals should be difficult, as the greater the difficulty, the greater the achievement; the more explicit they are, the more they will regulate performance; the more attainable they are, the more they will drive commitment; they should not be overly complex; and people require feedback (and support in overcoming obstacles) on their goals to stay motivated. The aim of achieving these goals is what Brian Tracy calls Return on Energy (ROE), namely to reduce physical and emotional energy on our life journey^[117].

Personal values are fundamental attitudes guiding our mental processes and behaviour, and they produce the belief that life is meaningful^[118]. They are an important element in Cognitive-Behavioural Therapy (CBT) in mental health services^[119]. Brabban and colleagues^[120] found in such services that a common complaint of patients was that care is done 'to them' rather than shaped for them, and that people wanted to be listened to and seen as people. Values are partly or wholly unconscious, and so clarifying them can be highly illuminating for the individual. They may take many forms, such as creative values (working or making things), experiential values (love and beauty), achievement values (valuing a career), relationship values (friendship), or health values (mental or physical health).

As we suggested above, the second focus of purpose should be extrinsic to the individual and based on the internalisation of the organisation's goals. This is, in effect, the localisation of the organisation's strategy deployment process in a way that is meaningful for the person in that it helps them build their purpose by combining the organisation's goals with their personal life goals. Few individuals in organisations find high-level metrics such as increases in sales and productivity intrinsically motivating, and hence such business metrics need to be analysed by the individual in a way that makes sense to them and is meaningful. For example, a metric such as productivity may appear abstract to an individual, but, after some discussion, they may find meaning in it by identifying something that they can easily measure that may hold some internal value to them, such as how many times in the month did they "make more than yesterday" or "coach colleagues to help everyone improve?". The key point is that the internalisation of the goal is done by the individual and measured in a way they find meaningful. This will also help their belief in organisational goals and their own ability to achieve their contribution.

5.1.2. Belief

The area of beliefs can be divided into two parts. The first of these is the personal beliefs of the individual, and the second is the wider organisational beliefs. Here we are employing thinking from Ajzen's Theory of Planned Behaviour^[121]. Simply put, if the individual or the organisation thinks something is possible, it probably will be, and if they think it is not possible, it almost certainly will not be. So, here, we build on positive psychology and focus on positive beliefs and behaviours. Simple illustrations might be the beliefs of an individual about whether a kaizen event will be a success before it starts. This will have a major bearing on their behaviour and the likelihood of success, the sustainability of the activity, and the individual's wellbeing. There is a need to overcome the quite widespread Imposter Syndrome, whereby individuals feel that they are not worthy or were lucky in the past and are not up to a particular role^[122].

As a result of the above discussion, we can see that meaning for the individual is a combination of purpose and beliefs. This can be recorded as a 'Plan for Every Person' as shown in the top part of **Figure 6**, which includes the time-bound meaning goals, measurement of progress, main areas of flow (from the individual themes described in **Table 2**), and main improvement activities to reach the goals (chosen from the individual themes). The latter two will be discussed below.

This top part will also include a small number of measures chosen by the employee that are meaningful for them and their contribution to their own purpose and beliefs, as well as those of the wider organisation. The lower area consists of the feel and act areas, which would be reviewed as frequently as daily. From a neuroscience point of view, this would best be done with a daily habit at a fixed time^[123]. The feel area would include achievements that the individual sees as significant to them, as well as one opportunity that is flagged up in the daily review. Opportunities can be of many kinds, from reviews of meaning to job crafting to an individual's behaviour, and can be developed over a number of days and managed through a simple agile kanban board^[13] with a small number of actions pulled as the individual (or their support structure) has time

for (**Figure 7**). Together with a kanban board, this is a type of Tier Zero board for the individual. The kanban board records major flow development activities (developed by the individual as part of the 'plan for every person'), smaller daily opportunities identified in daily self-reviews, as well as the support needs that are pulled by the individual.



Figure 6. Meaning, flow and daily reflection.



Figure 7. Individual Tier Zero Kankan Board.

5.1.3. Team level support

In order for the above to be successful, individuals require support from their wider team. This includes creating a sense of belonging within the team and the wider organisation, or what^[69] terms relatedness. Maslow recognised in his 'Hierarchy of Needs' that belonging is an irreducible need, and "recent research shows that finding a sense of belonging... is essential to well-being."^[124]. Nyameh^[125] shows that the need to belong in the workplace comes second only to the need to belong at home, and the EY Belonging Barometer suggests that 40% of adults experience feelings of isolation at work^[126]. This belonging may take the form of being listened to, cared about, and having a sense of common purpose, for instance, by encouraging team based decision-making about improvement activities^[15]. Other support from the team leader would be in terms of the creation and alignment of directions and measures. At the individual level, measures are best devised by the individual, but as discussed above, they are aligned to the organisational needs. This creates personal meaning and motivation. These measures might be performance related (KPIs) or behavior-related (KBIs).

Such support might involve coaching individuals in how they might relate their personal beliefs with the organisation's values and, in a similar way, helping the individual reconcile how their life goals might help the organisation achieve its strategy. Another area is offering support in the Tier Zero process. This may take the

form of a buddy, who may not be the team leader but another trusted individual. However, this buddying, and indeed support for activities on the kanban board, is, in the first instance, likely to be pulled from the team, but crucially as and when the individual decides.

5.1.4. Organisational level support

Some support at the organisational level might be needed, including from subject-matter experts in the human resources department or external agents such as psychologists or physiotherapists. However, it is incumbent on the organisation to provide a framework for meaning planning as well as training. It is also important that the organisation has a clear strategy and set of values that can be easily demonstrated by observable behaviour, communicated, and understood by individuals.

5.2. Individual level and support

The starting point and focus for mental and physical wellbeing is the individual themselves and the prevention of problems in order to create what Anger et al's.^[37] terms Total Worker Health. Oakman et al.^[19] demonstrated this need for 'substantial input from workers' in a four-step approach involving the identification of hazards, assessing the risks, controlling the risks, and reviewing control mechanisms. In essence, we might suggest this as the people equivalent of a Process Failure Mode and Effect analysis employed within the lean approach to condition- or preventative-based maintenance of machinery^[127]. In our conceptual model, we codify six areas that can be addressed by the individual, which will be discussed below. While these are described individually, they are often overlapping or causal in other areas. There is often no simple route to improvement, with one improvement method often positively impacting several areas. These improvements might be achieved from simple tasks such as pre-shift start-up exercises^[128], the use of an Apple Watch or Fitbit^[129] or meditation^[130] or a more complex activity such as ErgoVSM^[131,132].

5.2.1. Autonomy

As individuals, we are all seeking specific things in life that can be codified through the above-mentioned activity. Within the classic lean approach, many advocates promote the autonomy of the worker. However, in reality, autonomy is often limited due to the impacts of rigid strategy deployment and standard work procedures^[17,123]. Hence, more needs to be done to create autonomy.

According to Ryan and Deci's Self-Determination Theory, "the investigation of people's inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as the processes that foster those positive processes"^[69]. They identified three such needs, namely autonomy, competence, and relatedness, that "appear to be essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal wellbeing"^[69].

Deci and Ryan^[133] tell us that these needs are dynamic and that there are "within-person daily fluctuations in the satisfaction of autonomy and competence needs predicting within-person fluctuations in outcomes such as mood, vitality, physical symptoms, and self-esteem"^[69]. Autonomy is the biggest differentiator, together with the link between the three needs and the learned aspirations or life goals. Not only is the content of our goals important for our satisfaction, but the process of reaching those goals in an autonomous way is just as important.

The primary responsibility should lie with the individual. The individual will require considerable support from team peers, their team leader, and senior leaders. Their roles and behaviours will need to be considerably developed from the classic Lean organisation. To do this requires a "Plan for Every Person" so as to maximise the employee experience throughout the flow. However, in contrast to traditional organisations, this plan is, as much as possible, developed by the individuals themselves based on the meaning exercise discussed above (see **Figures 6** and **7**). Hence, the plan is autonomously applied by the individual during their Tier Zero meeting, which might typically take 10 min daily or slightly longer for weekly or monthly reviews.

Complete autonomy is very rare, and the level of autonomy will depend on the role and the organisational setting. To foster the maximum psychological benefit, the general maxim is "the more, the better". What we are trying to achieve here is the maximum autonomy for the individual within the constraints of the organisation. An important approach in this area is the concept of job crafting, which moves on from historical job design by management^[105] to job design (largely) by the individual^[92]. Job crafting "involves redefining your job to incorporate your motives, strengths, and passions. The exercise prompts you to visualize the job, map its elements, and recognise them to better suit you"^[134].

Hence, the employee is, as far as possible, working to define or refine their role. This should also be accompanied by a similar employee-led approach to their learning, with a personal learning plan primarily developed by and for the employee. This helps fulfill the competence need identified by Ryan and Deci within their Self-Determination Theory^[69].

Team-level support

These individual-level activities also require leadership from the other team members and the team leader. A key part of this is allowing the individual to maximise their potential and, hence, their wellbeing by avoiding command and control leadership. This, in turn, requires high levels of emotional intelligence. In particular, it requires the ability of team leaders (and other team members) to manage their emotions and show empathy. Emotional intelligence is also required by the team leader in order to undertake job crafting and co-create the role for the individual in such a way that it fits with the individual's needs and also those of the team and wider organisation^[92]. This might involve co-creating tasks (within standard work), relationships (with whom we work closely), and the perception of the job^[135] in order to create a psychologically positive perspective of the work.

Additional support will also be required by way of the ongoing work of the individual within their Tier Zero management, especially in terms of a buddy or other pulled support. A similar pull for support will be required to help with the individual pull training. Such training is likely, in the first instance, to be provided by the team leader or other subject matter expert within the team.

Organisational support

A number of organisational level support activities are called for. The first of these might be an extension of hotspot analysis (a method employed by Zokaei et al.^[136] to identify problem areas in environmental management) to the area of mental (and physical) health. This moves the focus beyond more typical support for psychosocial factors such as bullying and harassment to work and organisational factors for which managers have a clear responsibility, as called for by Oakman et al.^[19]. This might involve an organisation-wide assessment of different roles for their potential for mental (and physical) problems. This can then be displayed at an organisational level as a site mental and physical map. Based on the above job crafting cocreation, this will help the individual to move or adjust their role away from activities that might have particular risks to them, bearing in mind their existing mental (and physical) wellness and their susceptibility to different risks. Hence, part of the job crafting is here towards work that might be more motivational and less likely to cause wellbeing issues. An example of this is the 'perfect day' approach at Lundbeck in Copenhagen, where employees are asked for what happened in their perfect day so that managers can try to adjust the work to more often be like such 'perfect days'^[137].

The other major area of support from the organisation is that it adopts a lifelong learning perspective and encourages all employees to learn both along the lines that are directly of benefit to the organisation but also for the individual's wellbeing^[138]. Hence, this means the adoption of the principles of the learning organisation^[139] coupled to the lean sensei approach as well as an organisation-wide pull-based training approach^[137].

5.2.2. Connection and inclusion

Connection and inclusion concern what Ryan and Deci^[69] term relatedness. A good starting place is for individuals to build on their existing interests and passions and to develop either informal or formal networks of others with similar interests^[140]. An important addition to Wrzesniewski and Dutton's^[92] job crafting might be what Hines et al.^[15] call 'extra job crafting' as much of the connection and inclusion within the workplace takes place outside of the worktime and during breaks and after work activities. This 'extra job crafting' is therefore an extension of relationship job crafting. To add to Wrzesniewski et al's.^[134] words (modifications in strikethrough and italics) this wider concept "involves redefining your *total time at work* to incorporate your motives, strengths, and passions. The exercise prompts you to visualize the job, *including your non-working time*, map its elements, and recognise them to better suit you".

Connection and inclusion also involve valuing difference and creating space for others. This might include equity in fair treatment and inclusion of others by extroverts holding back and supporting or even presenting views on others' behalf. This is important not only for individual wellbeing but also for organisational performance. Homogenous workplaces are typically less innovative and lower-performing, as shown by research from McKinsey, which discovered that companies in the top quartile for gender diverse executive teams were 25% more likely to have above-average profitability than companies in the fourth quartile and, in the case of ethnic and cultural diversity, the likelihood of outperformance is even greater—at 36%^[141].

For their own wellbeing (as well as others'), individuals need to be supportive and ask for help^[142]. This is not always easy, particularly for anyone. Connection and inclusion are also increased by recognising others. This may be through simply thanking others or making it a daily, weekly, or monthly routine^[143].

Team-level support

The team can provide support by developing informal and formal social activities and encouraging team membership. This again requires emotional intelligence. You also cannot have inclusion without psychological safety^[93]. The concept of psychological safety, as it is related to the workplace, refers to people's comfort with taking a variety of risks, such as voicing their opinions, surfacing their own errors, and challenging practices^[144]. The basis of psychological safety is founded upon the way humans process information through the amygdala, which states that people focus on safety above all else and that this is unconscious^[145]. This is important for both individuals and organisations; Google's Project Aristotle found that psychological safety was the most important characteristic of effective teams^[146]. Team leaders and other team members need to develop an inherent appreciation that optimizing human potential in the workplace requires fostering safety, which will result in optimizing people's experience and thus engagement and wellbeing.

Much of the research on psychological safety follows a progression of human needs, from the need to be included to learn, to contribute, and finally to challenge the status quo across all industries^[93,144]. What makes these models important to understanding the workplace is that they present levels of safety that drive higher levels of performance, learning, and contribution. Correspondingly, each level of safety requires specific managerial behaviours to support reaping the benefits of achieving safety at each level^[144]. The team leader

will be required to coach others in these skills as well as foster an environment where recognition is a regular part of informal daily life within the team as well as formal activities such as team huddles.

Organisational support

Support for connection and inclusion is necessary with an organisation's systems, processes, and behaviours. This might include the provision of resources such as facilitator time, accommodation, yoga/meditation workshops, or sporting facilities. On a wider basis, this would include practices, support, and encouragement for the wider Diversity, Equity, Inclusion and Belonging (DEIB) within the organisation. This might start with the vision of the organisation as at IKEA: "to create a better everyday life for many people"^[147]. Also important is leading by example, as stated by David Hanrahan, the Chief People Officer at Eventbrite where "one thing that we have talked about in our leadership training is to start with empathy to build trust... It's about being in a compassionate culture wrapped around an important mission. And so empathy and compassion are different than being nice, right? It's different from being kind"^[148].

In addition, practices such as first aiders should be extended to include mental first aiders^[149]. This might be to help individuals cope with either work-related issues or those in wider family life, such as financial hardship or bereavement. Connection can also be fostered by company-wide recognition activities, which can have a major impact on creating a culture of health and improved quality of life^[150].

5.2.3. Stress

As individuals, we are all subject to stress in our work and home lives. It is widely viewed as a negative thing and is likely to be predicted by high job demands, low job control, low co-worker support, low supervisor support, low procedural and relational justice, and a high effort-reward imbalance^[20]. It can reduce an individual's ability to adapt as it reduces the rate of change in the brain, leading to increased costs and poorer work performance. Negative impacts for the organisation include sleep disorders, cardio-vascular diseases^[17], gastrointestinal problems^[151] sickness absence^[152] and depression^[153].

However, "stress serves a natural, physiological purpose that can help us solve important problems and learn and grow from our experiences. Instead of trying to eliminate stress, we should try to understand it and optimize it, minimizing the downsides while capturing the upsides. When managed correctly, stress can be an engine of personal growth and peak performance"^[154]. Indeed, if we are to achieve what Mihaly Csikszentmihalyi^[65] describes as 'personal flow', and hence wellbeing, we need to avoid employees being in the 'zone of frustration' where individuals are under-stressed or the 'zone of anxiety' where people are overstressed.

Building on the work of Oakman et al.^[19], we suggest individuals are self-reliant by following a three-step approach to stress:

• Find their area of optimum stress (not too low or too high) and their ability to recover from stress, as it is not just the stress but whether they have the opportunity and ability to recover from stress before it becomes chronic that is important^[154]. Chronic stress leads to burnout and according to Agrawal and Wigert^[155] this affects two-thirds of full-time workers at any given time. The stress and recovery rate vary by individual and might be gauged by checklists such as those provided by Ascher and Tonies^[154] and learning from sports science and developing stress supercompensation periods^[156] in formal and informal social interest groups. Recovery is also aided by creating clear distinctions between work and home life, for instance, not answering work calls or emails at home.

• Identify areas that cause over (or under) stress and assess their seriousness to the individual. Again, this will vary by individual and can be assessed through the types of checklists discussed above.

• The third step is for each individual, wherever possible, to control for known risks and review how effective this has been, for instance, in their daily Tier Zero review.

Team-level support

The team leader can support the team members by designing the work time to optimise stress (and reduce other areas such as fatigue). This might include the start of work exercises^[157], the scheduling of breaks, and rotation of physically-intensive and mental-intensive work to allow for recovery and supercompensation. This area has been better explored in the literature for the alleviation of physical effects such as fatigue^[158] but we suggest that this might also relieve stress. Hence, the teamwork might be designed so that activities such as team huddles and improvement activities might be spread across the day rather than concentrated at one time, especially if this is at the start of the day as with many team huddles.

In addition to this, if the team leader is aware of the various stresses affecting the team, they should be able to undertake a certain amount of stress balancing between team members. This might, for instance, be used to increase stress (or remove team members from the zone of frustration) by sharing duties such as 5S checks and the collation of performance measures. This will allow more time for team leaders to support individuals, for instance, in their pull for coaching in areas such as self-reliance.

Organisational-level support

At the organisational level, support can be provided to team leaders in developing the various skills required to support the team, such as resilience coaching^[100] as well as physical resources such as the provision of mental first aiders and crash-out rooms, which can be made available for individuals requiring periods of recovery. Such rooms should be co-designed with the employees and be conducive to wellbeing with plentiful natural light, comfortable seating, space to move about, collaborate, and kitchen facilities.

5.2.4. Safety

Here we will address physical safety in particular, although physiological safety is also required as discussed elsewhere. Creating a safe working environment is a crucial factor in employee wellbeing as well as in lowering costs for companies^[23]. Worldwide, 270 million work accidents are reported annually^[159]. The causes of these events are often related to the behaviour of the workforce^[160] or poor workplace design^[161].

To address the former, behaviour-based safety can be employed, which is based around the findings at Traveler's Insurance Company in the 1930s, where Herbert Heinrich found that 73% of reported accidents, illnesses, and injuries in the workplace were directly related to unsafe actions by workers^[137]. It is a bottom-up approach that involves individual (or group) observations of employees, goal setting, and feedback on safety-related behaviour with accompanying coaching. It is proactive and encourages individuals and their work group to consider potential accidents and assess their behaviour as safe or unsafe. This may be accompanied by preventative safety measures as well as more traditional lag and lead measures (e.g., the number of accidents and the number of near misses). An example of preventative measures (or key behavioral indicators) is 'positive interventions' at Welsh Water, where there has been some form of preventative action where the risk of a near miss is removed, such as the reporting and removal of a spill or walkway obstruction^[137].

This approach is somewhat similar to giving individuals the opportunity for hazard analysis and elimination by providing the type of organisation-wide assessment of different roles for their potential for physical and mental health as described above. Individuals might then seek to develop self-reliant improvements. Yazdani et al.^[25] suggest that an appropriate approach is to use simple lean tools and techniques that are already in use, "for instance, 'Kamishibai' and 'Ishikawa' for H&S issues in order to incorporate

prevention activities into lean management; in addition, 'process flow charts' Failure Mode and Effects Analysis (FMEA), decision-making tools, and job safety analysis are appropriate tools to use for integration of prevention activities."

Workplace safety also relates to an individual's work-life balance, with overworked employees more likely to have accidents^[162]. Improving work-life balance also positively impacts employees's psychological well-being, and organisations are able to increase affective organisational commitment, job satisfaction, worker engagement, organisational citizenship behaviours and employee productivity^[163].

Team-level support

Individuals can be supported by the wider team through the extension of behaviour-based safety to look out for others and the risks they face. As mentioned above, the use of measures at the team level can considerably influence individuals to help with their safety (and indeed other areas of their mental and physical wellbeing). In this regard, we advocate that measures at the team level should be preventative and employee focused, such as the 'positive intention' behavioural measure at Welsh Water, as well as a KPI that gauges the success of this, such as 'near misses'. At the organisational level, we suggest the rolled-up local teams' measures of 'near misses' as well as the measure that it impacts, namely 'accidents'. Support for work-life balance might also be provided by peers, for instance, in swapping shifts to help with 'life' requirements.

Organisational-level support

Hence, at the organisational-level the use of appropriate measures can assist teams and individuals by monitoring performance and focusing attention and support. There also needs to be the active support of behaviour-based safety as well as the organisation-wide assessment of different roles for their potential for physical and mental health, as described above. In addition, policies need to be developed to support an appropriate work-life balance.

5.2.5. Ergonomics

Ergonomics is a scientific discipline that looks into the interactions of people with other elements of the system, applying theory, principles, and design methods with the goal of improving human wellbeing and overall system performance^[164]. Salvendy^[165] describes it as a body of knowledge successfully used to adapt job requirements to individuals. When jobs are not so adapted, they are likely to exceed human psychological and physical capabilities and create musculoskeletal disorders (MSDs)^[166]. The most common of these are due to awkward posture, repetitive motion, and high force requirements. Unfortunately, in many organisations individuals are not aware of the ergonomic features of their work^[23].

In common with the other themes, we suggest that the workers should take as much control as possible over the ergonomics of their work areas. This will involve individuals undertaking an analysis of their daily work, identifying risks, and seeking to eliminate them. At the simplest level, this might involve checking your posture, alternating tasks, lifting with your knees, getting a good chair, reviewing your computer layout, avoiding eye strain, and relaxing tense muscles^[41]. It is also useful to plan your daily work and take appropriate rest.

Team-level support

According to Yazdani et al^[25] organisations ought to present ergonomics and MSD prevention as a significant part of their management practices. The team leader can support the team members by designing the work time to reduce excessive repetitive activity (and stress) with start-of-work exercises^[157], scheduling breaks, huddles, and kaizen activities, and rotating physically-intensive (and mentally-intensive) work to allow

for recovery and supercompensation. Mathiassen et al.^[158] indeed found that recovery from physical fatigue is faster if individuals are given mental tasks that are challenging but manageable rather than purely resting.

In addition, team leaders should be the first line in raising awareness and training in ergonomic risks, analysis methods, and countermeasures. This is likely to also lead to productivity and quality gains^[167]. Ergonomics should be seen as an integral part of improvement projects run within the team, rather than an end-of-project bolt on^[168] or some stand-alone MSD prevention programme run by people outside the team^[23]. One good example of this is the ErgoVSM approach developed by Jarebrant and colleagues^[131,132] which extends the familiar lean Value Stream Mapping approach by adding measures of ergonomics (posture and weight/force) and work content (mental demands and control/influence) at the task level as well as a composite measure at the value steam level for ergonomics (average ergonomics and rest) and work content (rest and communication). Hence, analysis and improvements might be made, with sufficient training, by the individual at the workstation level, by the team at the value stream level, and rolled up as an organisational measure along the line of the site mental and physical map discussed above.

Organisational-level support

Organisational support for ergonomics might include the site mental and physical map as well as the design of the whole facility. Perhaps the most important thing, however, is creating the mindset that ergonomics is a core part of the work and that it should be part of any workplace design or improvement activity.

5.2.6. Physical fitness

Being physically fit leads to fewer injuries and sick days, thereby reducing health-care $costs^{[169]}$. It is generally seen as comprising: cardio-respiratory capacity, strength, and agility^[170]. Tests for these vary somewhat, but may include cardio-respiratory capacity, strength and muscle resistance, flexibility, and body composition (particularly waist measurement). Caspersen et al.^[171] identified the health-related components of physical fitness as: cardiorespiratory endurance (VO₂ max), muscular endurance (press-ups and sit-ups), muscular strength (press-ups and sit-ups), body composition (body fat test), and flexibility (sit and reach test).

Clearly, individuals can improve their physical fitness by adopting a healthy lifestyle by stopping smoking, reducing alcohol intake, adopting healthy eating habits, and taking regular exercise^[172]. A good starting point is having a way of measuring and targeting improvement through the Tier Zero approach described above. Early experiments with this type of monitoring were carried out with Beijing bus drivers due to fatigue, which was causing accidents^[173]. More recent wristbands have been used there to collect information on sleep, exercise, and even monitor if the 1800 drivers are depressed or anxious^[174]. These watch faces can read the driver's temperature, heart rate, breathing pattern, blood oxygen level, blood pressure, and mood and send warning messages. The implementation of this 'surveillance tracker' approach does not align with our thinking, nor do we believe it is ethical, as it does not appear to be voluntary and has attracted criticism from Jingshi Law Firm in Beijing^[174].

A later, more ethical approach, which is aligned with our thinking, was adopted by Heikkilä et al.^[175] in their voluntary experiments with 10 machine operators using a smartphone optimised web application in three metal industry plans in Finland. They were concerned that imposed measures based on easy-to-measure metrics would not support health goals^[176] and cognisant of Pantzar and Ruckenstein's^[177] finding that visualisation and contextual information make the data more meaningful to self-trackers and increase their sense of self-accomplishment. "Meaningful feedback that supports the autonomy of workers by allowing them to decide how to utilize it has the potential to support their intrinsic motivation to engage in work activities instead of

having to engage them"^[175]. They combined measures of ease of work, number of steps, restful sleep, and resting heart rate with operational metrics (machine running time and the time to resolve problems). This type of 'self-tracker' approach can be further extended with the relatively cheap functionality of smart watches such as the Apple Watch, which can also measure cardiorespiratory endurance (VO₂ max).

Team-level support

Trying to improve your physical fitness can be a lonely experience^[178] and hence the support of team colleagues and team leaders is very helpful. This might just be for moral support or, for instance, in terms of having a fitness buddy. Team leaders can also support by ensuring that start-up exercises happen at the start of each work shift.

Organisational-level support

At the organisational level, again, support and encouragement are required, as well as the provision of site or local community activities such as a slimming club or various sports groups. Also important are 'nudges' from the organisation involving any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives^[179]. Examples of this might include placing healthy food in easy-to-find areas in a canteen to remind people about healthy eating. However, it is important that these nudges are minimally intrusive to the individual, for instance, by providing the calorific count of food, or else they may be viewed in a negative light^[180].

6. Illustration and conclusion

In this conceptual paper, we have attempted to extend the People Value Stream approach^[14,15] to the Mental and Physical Wellbeing flow, one of seven flows. For the People Value Stream approach to be successful, employees need to understand what they want, convey this 'voice of the employee, and develop a path to achieving it. This inside-out approach is required to achieve both lean flow and personal flow. The Mental & Physical Wellbeing flow has the largest impact on employee wellness as it creates a self-developed 'plan for every person' and a customised self-delivered 'single person flow'.

Box 1. Mary's case.

She is working on particularly are the Learning and Development flow (to learn the new competence required) as well as the Mental & Physical flow (with regards to fitness and stress). She defines three main improvement activities (analogous to lean A3 projects) to work on during the year:

- Get classroom and on the job trained and coached by the team leader in the new competence of a 5S audit
- To join the work gym and develop a personal training regime to follow
- To identify what over- or under-stresses her in her existing role and find ways to make improvements

She develops her own personal kanban board with these three main improvement projects and asks for support from the team leader in the first, the organisation in the second and again the team leader in the third (and later an HR colleague).

At the end of each day, she notes down things she has achieved during the day like 'an increase in the number of steps she has made due to the lunchtime walk', 'the coaching support she received form the team leader on 5S' and 'the positive support of her work colleague on her increased fitness'. She also notes down the one opportunity she thought of which was to 'go and observe the 5S audit in another team'. This opportunity (analogous to a suggestion card) is then placed on her kanban board with a view to asking for help with this when is appropriate. During the year she keeps up her 'plan for every person' and this helps her not just achieve her goals but to improve her self confidence, wellbeing and by becoming more self reliant, manage her stress levels which she discovers was because she was often under-stimulated.

Mary is currently in a front line role and developed a life goal to become a manger with the medium term goal of becoming a team leader. Going through the steps we showed in **Figure 6**, she developed a short term goal (which she defined as 1 year) of taking on at least one area of responsibility, improving her physical fitness and finding a way to manage her stress levels (some of which was caused by having too little responsibility). In order to measure this Mary found that taking on a goal is a simple yes or no, her physical fitness can be measured by her VO₂ reading on her Apple watch and her stress level can be measured on how she feels at the end of her shift.

The Mental & Physical Wellbeing flow is designed to enable individuals to develop their personal meaning and wellness throughout their lifetime through the proactive improvement of all aspects of their health, supported by their team and the wider leadership of their organisation. This can be seen by way of the hypothetical example of 'Mary' in **Box 1**.

The approach presented here requires testing in future research. It has a range of implications. For the academic community, it provides a framework to apply an inside-out approach as well as a way of extending lean thinking to a range of other academic disciplines. For the practitioner, it provides a way to put the field of Mental & Physical Wellbeing at the centre of the business and highlights a way to motivate employees and help them care for their own health.

Author contributions

Conceptualization, research, PH, CB, CG and CJ; writing—original draft preparation, PH; writing—review and editing, PH, CB, CG and CJ. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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