SPE International Health, Safety, Environment, and

Sustainability Conference and Exhibition

10–12 September 2024 | Abu Dhabi, United Arab Emirates

SPE-220464-MS

Structural Understanding Underlying the Safety Culture Ladder

T.G.L. Hudson[1], P.A.R. Hudson[1], P.T.W. Hudson[1]

[1]Hudson Global Consulting, Leiden, The Netherlands

Abstract

OBJECTIVES/SCOPE

The paper discusses the underlying structures driving the management of risk in different safety cultures as described by the Hudson Safety Culture Ladder. The paper links different causal models employed by organisations to the stages in the ladder and uses a case study to illustrate the fundamental concepts.

METHODS PROCEDURES, PROCESS:

The management of risk within organisations is driven by the underlying causal models that the organisations management uses to make sense of how the world works. The paper considers management actions and activities in the light of this. Taking these insights, the paper then maps the concepts onto the safety culture ladder descriptions as contained in the Hearts and Minds Understanding Your Culture framework.

The paper then extends the concepts into novel dimensions to demonstrate the applicability of the findings and methods.

RESULTS, OBSERVATIONS, CONCLUSIONS:

The Hudson Safety Culture Ladder describes four levels of safety culture. Each of these cultures are shown to be the observation of different structural approaches to the risks that the culture is exposed to. These approaches are linked to the breadth and complexity of the risk spaces the organisations operate in.

This means that organisations can tailor their cultures to the operational reality they operate in. This enables efficient allocation of resources.

A simple narrow risk space only requires a culture to be Reactive, using an Unstructured approach to failures to fix problems as they arise.

A broader complicated risk space requires a culture to be Calculative, taking a Structured approach to ensure that learnings from failures are applied across the entire organisation

Complex risk spaces require a Proactive culture that is not only Structured, but also sensitive to the operational context.

A highly dynamic complex risk space requires a Generative culture that is Structured, Operationally Context sensitive, and Internally Context sensitive.

The paper uses these concepts in a case study with a world class aviation engine MRO to help illustrate.

Please explain how this paper will present novel (new) or additive information to the existing body of literature that can be of benefit to a practicing engineer.

The safety culture of an organisation is not a monolith, but should be considered in the context of the risk spaces it operates in. The concepts in this paper can help fine tune cultural understanding and improvement activities.

Problem statement

In SPE-190676-MS Moving Up The Culture Ladder: Creation and Application of Management Methods to Guide Organisations Towards Generative, a Case Study. We set out the basic understanding of the challenges posed by the desire to develop safety cultures and the difficulties that those challenges create.

"A good culture of safety ensures that high-hazard operations will be carried out safely and reliably. The HSE culture ladder provides a road map that helps define the current culture of an organisation as well as providing a target for improvement. The ladder captures both the definition of cultures in terms of values, beliefs and attitudes (feel) as well as in terms of behaviours as "How we do things round here" (do). HSE leadership can be seen as developing a vision that can be defined in terms of the processes and activities that characterise a higher rung on the HSE culture ladder.

A good culture of safety, together with an effective safety management system, provides one of the best guarantees for a high level of safety performance. Culture is often defined in terms of the set of beliefs, values and attitudes as well as ways of behaving. In the case of HSE culture, these behaviours are about how HSE is valued and how good HSE performance can be achieved. This is the notion of culture that is usually assessed by surveys. For those individuals and organisations that wish to improve their culture, however, concepts like beliefs and attitudes are abstract and hard to change. Behaviours, on the other hand, can be influenced more directly and fit with the alternative definition of culture – "How we do things round here". In fact, there is an asymmetry between the definitions. If we know how people behave, especially when no one is watching, we can infer their beliefs, values and attitudes, whereas they may not always live up to the values they profess in public or in surveys. If you are looking to construct a framework to develop the safety culture, behaviours provide the best route for improvement.

The Culture Ladder as a Road Map

The HSE culture ladder - ranging from the Pathological through the Reactive, Calculative and the Proactive to the Generative - provides a road map that helps define where on the road an organisation currently stands and also provides a target for change: typically one step higher on the ladder within a foreseeable time period of 2 to 3 years. Each step on the ladder can be defined in two ways. One is 'soft', how the culture feels; the other is 'hard', what people actually do. These descriptions can be captured at each of the five levels and used both to assess the current situation (Does this describe us?) and also to define behaviours that are representative of a more advanced culture, usually one step higher on the ladder (Can we do this if we try?).

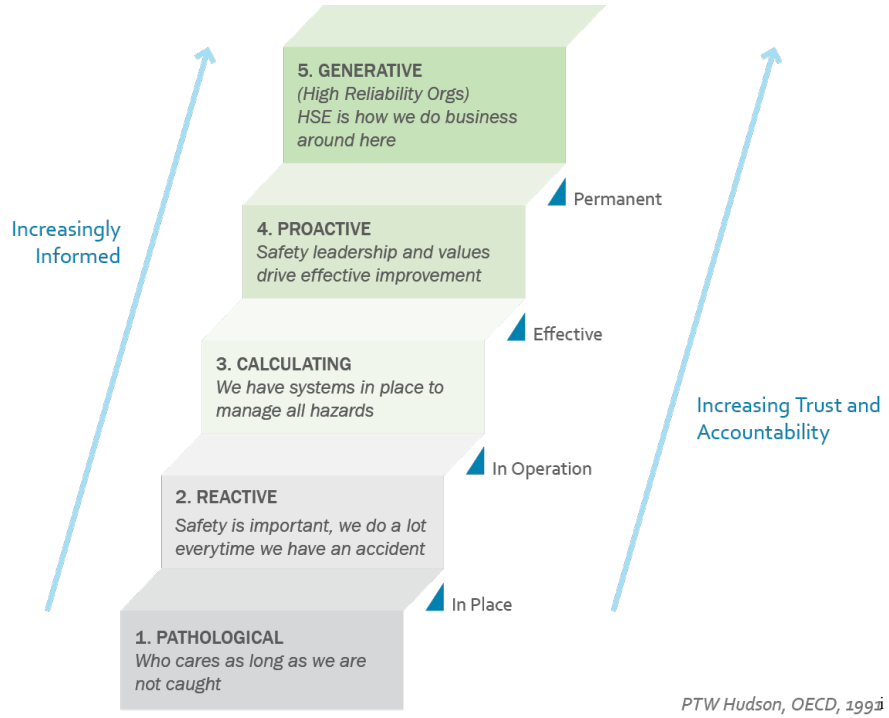

Figure 1, the Hudson Safety Culture Ladder

An advantage of the ladder approach to culture is that it recognises that the HSE world is not dichotomous – you are either an HSE culture or you are not - but rather that there is a progression of distinct cultures that can be arranged, as rungs of the ladder, representing increasing organisational skill at the management of HSE. One insight that has been gained is that survey-based models of safety culture and associated interventions for improvement use agreement/disagreement to questions that are anchored at the top-most level, the Generative or the High Reliability Organisation. For instance, survey items like: "I believe my business unit has a just and fair culture" or "I believe senior management demonstrate and drive genuine commitment to safety" are statements that describe an advanced culture, but at lower levels can be hard to make sense of, as most organisations are nowhere near the proactive level that the survey approach assumes. So, for instance, an empowered workforce may be characteristic of an advanced culture, but first you need to have a workforce that is skilled enough to merit the trust that empowerment requires as well as a management that is mature enough to trust their employees. To ask an organisation that is predominantly reactive in its approach to the world to transition directly to the generative is going to be very hard, if not impossible; over-reaching ambition makes failure much more likely and may even make things worse when failure to improve is experienced at all levels. Another insight from the ladder is that when there is too great a disparity between those who are far ahead and the rest, they literally cannot understand one another. As a result, many programs, led by the best-intentioned, have failed because of a failure to understand each other, and thus develop a common vision."[ii]

In the paper, we argue that there is correlation between the position on the ladder and what actually happens in the HSE management area. This was posited to be a progression between the steps characterised by the movement from "in place" to "in operation" to "Effective" to "Sustainable" as shown below.

- In place — Pathological -> Reactive
- In operation — Reactive -> Calculative
- Effective — Calculative -> Proactive
- Sustainable — Proactive -> Generative

This paper further argues that while the progression describes the overall changes to the holistic risk management processes, in organisations the underlying structures that drive the transitions are more complex and are based on the fundamental understanding of how risk management failures occur in the understanding of the members of the organisation, beginning with the senior management.

Learning from building Safety cultures

Through the use of the processes and theories set out in SPE-190676 with a broad array of organisations in different industries we were able to gain significant experience with the actual changes made to drive the cultural change. This has enabled us to closely identify the changes required to enable the gains desired.

Moving from description to structures

The Hudson Safety Culture ladder was developed in an observational fashion with discussions, interviews and surveys building on the extended model developed originally by Ron Westrum[iii] (Westrum, 1988, 1991) who distinguished three cultures, the Pathological, the Bureaucratic and the Generative. Hudson (1991) extended the Bureaucratic into the Reactive, which is a safety culture albeit not always very good, the Calculative, which is data driven and often obsessed by the need to follow process, to the Proactive which attempts to get ahead of the game. Taking five rather than three steps creates a natural sequence with a direction. The original work collected descriptions of the five different levels from 30 managers and supervisors for what started with the use of the descriptions provided by the Understanding Your Culture Hearts and Minds tool to develop and drive change demonstrated the issues with descriptions as a goal setting tool rather than a purely descriptive tool to understand where an organisation is.

These issues were two-fold:
Firstly, the descriptions contained emotive language that spoke to how working in the organisation felt.
Secondly, the descriptions were too short and did not actually encompass the entire cultural dimension that they were describing.

This dual challenge created the need to develop new cultural dimension descriptions. Accordingly, this then precipitated the development of a new understanding of the underlying structures that are fundamental to the different steps on the ladder.

Underlying theory

Hyper dimensional Risk spaces

SPE-199401[iv] (Hudson,2020) Is based on the axiom "The social-technical system that runs risks does not experience or manage risks in a serial fashion. Risks within a system are parallel, and thus should be taken as a sum.
This means that risks should be summed, even when each component does not appear to be salient. *All* risks should be included even when those individual risks are below the acceptance threshold. When the summed risks are greater than a threshold (as defined by the risk system) this risk value should be seen to be equal to the single risk value of equal value."

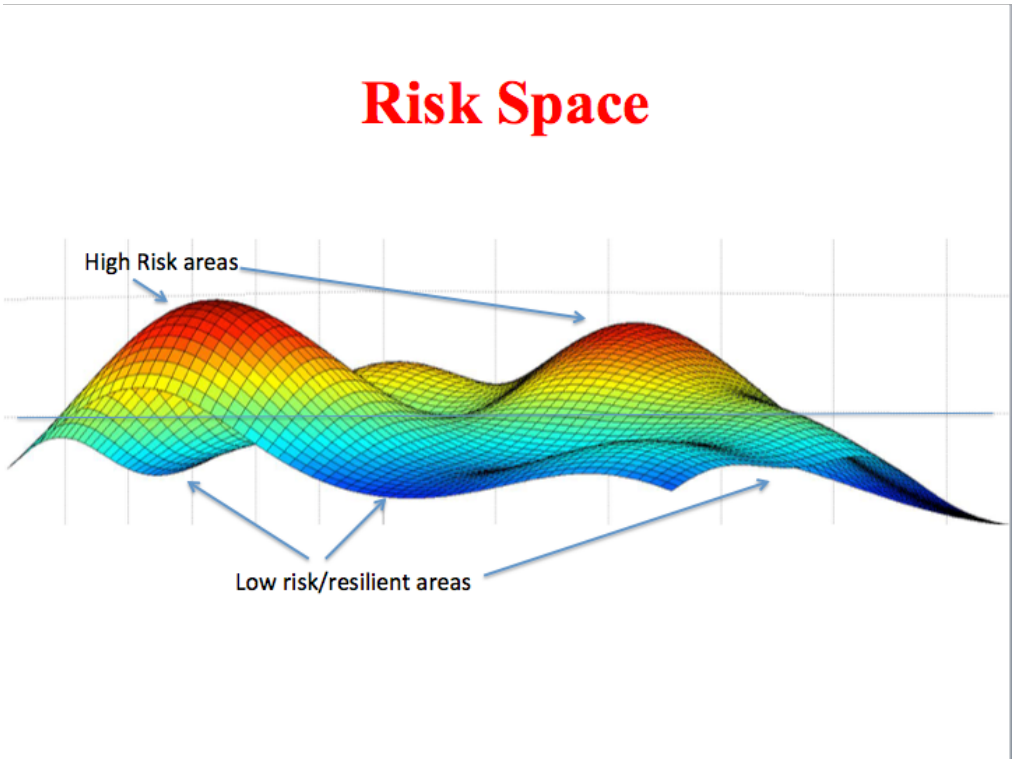

Figure 1: A risk space

Based on this axiomatic approach, the paper examines the risk space for the probability of a vehicle skidding and shows that that simple single numerical values cannot properly describe the real-world probability of skidding:

"**Example – a vehicle skids**

We can take an outcome we wish to avoid: a vehicle skidding. A skid can result in nothing more than some marks on the road, but can also lead to the death of the driver or passengers as well as third party fatality. The vehicle may be damaged and the environment adversely affected. If we allow a skidding vehicle to represent the loss of control then we can have a simple historical frequency – how often per year do we have skids? We can select outcomes such as injury or death and then compute the risk of such an outcome for an operation with say 1000 vehicles as 1000xfrequency-skid. With an average skid frequency of 10 per year the probability of such skids is simply 0.01. But the picture is more complicated than the simple 'point probability' value of 0.01. Under some conditions such as wet roads, poorly maintained tires, inexperienced drivers etc, the actual frequency is raised, while under ideal conditions we may only have a skid once in a year.

When driving a vehicle, the probability of skidding on wet roads is dependent not only on how wet the road is but also on factors such as driver ability.
These two factors are independent of each other, and each of these factors is clearly also a distribution. We can say that as these two factors do not interact with each other- the driver's ability is not correlated with the wetness of the road surface; they are orthogonal.

Thus, the probability of failure (skidding on a wet road) in this example is not a simple two-dimensional distribution. It varies for each of the two orthogonal factors - road wetness and driver ability. It is thus a three-dimensional probability distribution. If we add the state

of the tires, another equipment related and independent dimension, we can now distribute the overall risk over the multi-dimensional causal factors.

The consequence side of the risk equation is also a distribution, as the potential consequences depend on more orthogonal factors such as traffic density and physical obstacles. This too is a three-dimensional probability distribution.

So how can we define the risk for this driving example? It still follows the standard equation *probability x consequence = risk*. If we vary the ability of the driver the risk changes too. The same is true when we vary the traffic density, the state of the car and the weather and, by extension, several other orthogonal dimensions.

Riskspace for N-dimensions

The definition of risk provided above means that we no longer understand risk as a point or single number, but as a value that varies as all the underlying dimensions change. We can thus define a riskspace as the N+1-dimensional space that describes how N-dimensions interact to define the risk at every single point in the space.

In this example the 5 orthogonal dimensions (Road wetness, Driver ability, Vehicle state, Traffic Density, and Physical obstacles) are combined to form the 6-dimensional risk space for the immediate risk of skidding on wet roads. Here the combined risk value forms the 6th dimension, one which is also continuously distributed over the range of outcomes. The distribution for personal safety ranges from no consequence to multiple fatalities, often represented as a number (5-6) of discrete categories as used in conventional risk assessment matrices, but it is really a continuous distribution of outcome probability. If we also wish to add process risk to personal risk (and by extension add cost, environmental and reputation consequences) to make a more complex value that is itself multi-dimensional[1]. The simple unidimensional risk value that is conventionally computed, such as skidding accident risk per vehicle per year, now appears as a rather impoverished number when it is exactly the variation over the distinct dimensions that we would wish to understand in order to be able to manage and reduce the likelihood of having an accident.

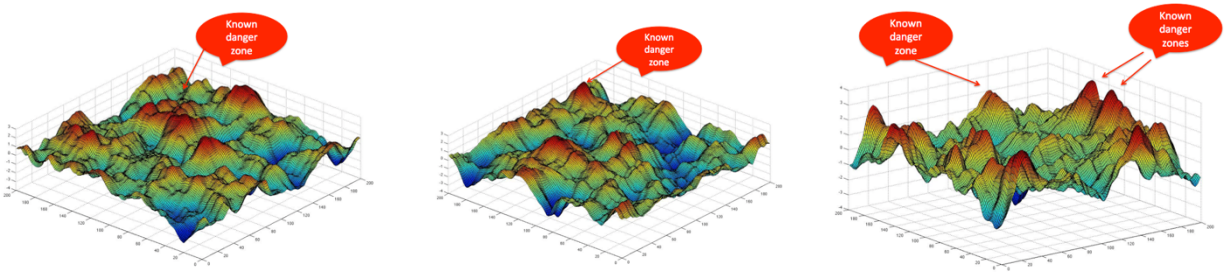

Figure 2: Three risk spaces containing 6 dimensions with risk as the vertical dimension

No higher calculus needed

A 6-dimensional riskspace may be considered by many to be impossible to understand, let alone use, as they assume understanding of a higher calculus is required. This is not the case. What we are interested in is not visualising the whole mathematical multi-dimensional space. That is impossible in conventional representations. What we are interested in is how the different dimensions interact.

[1] We can imagine a particular event as having high process and environmental values but low personal and medium reputational values. This risk dimension would itself be the sum of four outcome dimensions.

The risk space described in Example 1 is actually well understood and successfully managed by billions of drivers every day. Drivers change their behaviour depending on all four of the dimensions described. Numerous studies have shown that drivers manage the amount of risk they take and are prepared to accept, reacting to changes in this complex risk. When risk increases on two dimensions in general risk is reduced in other ones, for example by reducing speed or increasing distance to other vehicles. In fact, Example 1 is a simplified risk space for the risk of slipping on wet roads: A risk space intrinsically understood by drivers[2] around the world!"

Reactive – a safety culture

For the move to being a safety culture, the organizational belief that safety is important is necessary; reacting to safety failures and developing solutions to address them. A reactive culture strives to make sure that the failure in the past does not happen again. For almost all the risk spaces that a normal organisation operates in, this is sufficient. Nevertheless, this does not mean that merely caring about safety means that an organisation is a reactive culture. The organisation demonstrates this through the development of investigation and remediation processes.

Calculative - Structured

The Calculative culture is almost always developed in reaction to the basic fact that, despite the best efforts of an organisation, the incident rate is still not at a level that the stake holders desire. This is at least in part due to the fact that people are developing a more sophisticated understanding about how and why accidents and even minor incidents happen and are caused. The management comes to the understanding that the organisation, rather than the front line workforce is the major source of failures. When the lessons from past incidents do not appear to have been properly learnt or carried out, this leads to an understanding that, without a structured approach to risk management, the organisation will continue to suffer the same outcomes.

This structured approach can be seen as the organisation realising that the mechanics of risk management have to be safeguarded and that efforts have to be made to ensure that what has been decided is indeed actually implemented. Thus, senior management places a greater emphasis on regulatory controls. These controls such as audits and standards help to identify and remediate the gaps in the procedural sets and management practices that still allow failure to propagate through the system. As the understanding that the failures are caused by the system spreads through the organisation, the entire workforce understands the need for the controls and checks. This leads to feelings of unease when controls are not properly in place.[3]
While often regarded as a rigid and overly bureaucratic approach to safety (mostly by commentators that do not understand the risk spaces that these cultures work in), the calculative culture uses a structured approach to ensure that all risks are analysed and managed. This enables these organisations to thrive in high risk environments.

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[2] Drivers may manage their workload by turning down the volume on the car radio or external factors by switching on more lights and hazard warnings. They may even decide to pull off the road to take a rest and avoid third parties completely.
[3] Contrast this with the lack of unease when the drilling plan for MC-252 was not under management system control. The decision to not "grandfather" the process into the implementation of BP's OMS was the key risk decision that has the greatest impact on the events on the Deepwater Horizon on the 19th of April 2010.

Proactive – context sensitive

The biggest challenge for calculative organisations is that there appears to be a small number (20%) of their incidents that are not tractable and still keep on recurring despite rigorous application of the risk understanding built up in the company. The standard solution to this is to apply the processes with renewed vigour. Strangely enough, this doesn't work.

Proactive cultures approach this from a different angle. Instead of increasing procedures, rules and processes, proactive organisations move the decision-making authority closer to the operational context. This is what we call "*context sensitivity*". This enables the operation to respond to the operational context by being sensitive to the variations in the operations, the culture can prevent disruptions eventuating in incidents.

Often described as workforce empowerment[v] (Nykodym, 1994), the concept used is the movement of the risk decision to the closest locus of control. This means that management no longer makes all the risk decisions, but instead ensures that the decisions are being made by the right people. In addition, this frees up management resources to look ahead and manage the risks that are not eventuating on the operational context, yet.

The proactive culture is one that seeks to match the decision-making locus of control with the correct span of control. This means that the decisions on how to manage the risks are made by the parties with the greatest ability to make the right decision. This means, for example, that the workforce itself has the tools and power to organise their workplace. Concurrently, the supervisory staff places the workforce in the best possible position to excel in their roles. Management works to ensure interactions with other parts of the organisation do not negatively affect the works. Management thus has to ensure that future challenges can be met by being forward looking and planning for such challenges.

Thus, the structure becomes sensitive to the context it operates in. For the workforce that is the work floor, for the supervisors it is the day-to-day operation, and for management it is the interactions within the organisation.

An example of this is the changes in function requirements for module foremen in an Engine Maintenance Repair and Overhaul company the authors -worked with over the past three years. As they have transitioned to a more Proactive culture, they changed their operational structure to use Cross Functional Teams (CFTs) that have been assigned much more of the day-to-day decision making within the company. With these CFTs making the decisions the foreman's role changed to a much more managerial role.

A further example in SPE-220251[vi] (Hudson, 2024) sets out the proactive culture built to manage the risks of road transport in Africa. It uses the Levels analysis developed in "Integrating cultural and regulatory factors in the bowtie: Moving from handwaving to rigor.[vii]" (Hudson, 2015) to differentiate and assign roles to different levels in the organisation.

"SPE-179472[viii] (Hudson, 2016) describes a major road transportation operation set up to move large volumes of rock (360,000 tonnes) across the country of Benin to construction work in the port. Considering the obvious risks involved in a driving operation of the planned scale and given the risk environment, the focus was to use all available tools to implement the project in a safe and effective way. This resulted in a process that took onboard the contractor's management team in identifying the major process barriers, identifying the obvious risks that undermine barrier effectiveness, and putting in place mitigations.

The major observations were that the organizational culture had to focus less on the actual carriage of material but rather more on putting in place the means by which drivers could perform at their optimum. The driver pool was responsible for managing the immediate L1 barriers, whilst the management team put in place control measures that guarded against the undermining of these barriers. These L2 barriers focused on equipment quality, communication and driver welfare. The direct control of the operation, such as whether to halt or commence operations remained with the supervisory staff, who were also undertaking driving duties. This meant that the direct control and communication around barrier effectiveness at the L1 and L2 barriers was proximal to the physical operation. Management retained the duty to ensure that the resourcing and contractual limitations met the overall objective of the operation. This was the control at the L3 level which set the culture for the operation.

What did management do? They resourced the driver pool with a group of senior drivers who understood the limitations and capabilities of their subordinates, the specific road conditions and risks around routing and times. This was essentially an expert group of drivers. They provided additional driver welfare facilities to facilitate knowledge exchange and build a coherent culture. Along with this they revised the contracting terms to ensure minimal personnel changes further ensuring cohesion in the driver pool. The management team took on responsibility for outreach programs that looked to control, through information programs, the interaction with third parties. These are all L3 responses to ensure that the barrier failure risks at L2 are minimized, which in turn minimizes the L1 barrier failure risks.

At L2 the supervising drivers ensured that the vehicles were maintained correctly, repaired as necessary and that the controls along the route (in the absence of In-Vehicle Monitoring Systems, IVMS) were in place and effective. They conducted enroute audits, ran driver workshops, toolbox talks and participated in the initial workshops that defined the scope of need for the safe operation and creation of a coherent culture.

The above points resulted in L1 barriers working effectively and a significant reduction in the incident rate. The expected rate was two to three incidents with fatal outcomes and around 30 incidents involving injuries. The result was at least an order of magnitude better with a single incident resulting in injury and two non-injury high potential incidents. The success also resulted in an extension of the contract moving a further 180,000m^3 of sand across the major city.

Senior management becomes involved in the management of driving risk through the development of self-regulatory processes in L3. L2 is structured to support the L3 self-regulatory processes. L1 is strengthened in this process. “

In the example, the decision making was moved to the appropriate locus of control, with trained and experienced frontline operators making day-to-day decisions and the higher levels of management working to support them.

Generative – internally context sensitive

The generative culture is required when the situation is either too dynamic or complex. The generative culture can be seen as the extension of the context sensitivity of the proactive culture to the internal operational context of the operation. The structure is based on the explicit understanding that the knowledge needed to make a correct decision does not rest within the organisational rules or hierarchical structure. Instead of moving the locus of control to the correct span of control, the generative culture seeks to move the span of control to the correct locus of control.
Thus, the decision-making authority moves to the expert with the correct knowledge and understanding of the situation.

This can be seen in Special Ops forces where members of small teams wear different hats depending on what the question is. Each team member has specialisation in multiple areas and are effectively in command of the team for those areas. The hierarchical structure of rank is only concerned with the achievement of the overall goals of the team.

Example: Lunatics running the asylum

Drayton was an open cut coal mine in Australia where “the lunatics ran the asylum”. Instead of the normal strict hierarchy of a coal mine with a management team and workforce doing what they were told to do, the managers, driven by the vision of the mine’s general manager, set general production targets and left it to the actual miners to decide how to achieve them. The general manager had a vision that took two years to achieve. Coal miners typically started their shifts by ‘putting their brains in a box’: the gm made them put them back in their heads and use them, which was initially very uncomfortable. The decision was taken to have a permanent night shift, with its hours set by those on the shift while the other two shifts alternated between morning and afternoon shifts leaving the night shift to have a life minimally disrupted by the demands of night shift working. Rotating night shifts are extremely disruptive for the personnel and their families, so this minimized the disruption.

Normally miners have a single trade – haul truck, shovel and dragline – that is what they do. At Drayton, the miners swapped around, relieving boredom, and only sticking to their trade when the going was particularly difficult.

A general strike was called in the coal industry but the Drayton miners refused to go on strike. Understanding the long-term possible effects in the community of not going on strike, such as ostracization, the mine management had to resort to ordering their workforce to go on strike, which they reluctantly did after being promised compensation for lost work. Instead of striking a number of miners joined the authors and the management team in designing a new tool, the Rule of Three for the three days the strike lasted.

They were the most productive and safest mine in the Hunter Valley and only in its final days did they have to resort to coal-washing which is an indicator of how good they were. Usually when a mine reached its end, the workforce would be let go and then at a new mine, hiring would start from scratch. At Drayton, the workforce was retained and set to work designing the new operation in order to have a flying start. The GM told the authors he had considered giving them the hiring and firing decisions.

This example shows how the decision-making authority was allowed to move around the organisation. Through cross training and strong leadership, the people with the best vantage point for making the decisions were empowered to make the decisions for the entire organisation. This move from hierarchy to a heterarchy[4] brought great efficiencies and created the most profitable mine in the region, but required a great investment in time and training.

Moving around the ladder

Taking this view of how and why cultures operate this way lets us understand that it is the locus of control that is key to understanding why cultures operate in the fashion they do. In the reactive culture, the culture cares about safety but has not structured the risk decisions. In the Calculative culture, the culture has ensured that the risk decisions are made by competent authorities in a structured fashion. The Proactive culture moves the locus of control to fit the span of control, while the generative culture actively moves the span of control to the best possible place in the organisation.

Discussion

When you consider the steps on the Hudson Safety culture ladder using the underlying structures, the key question becomes why do cultures require different approaches. Basically, what are the evolutionary pressures that drive the evolution of the structures into the higher level steps?

The answer we propose is the risk spaces (Hudson, 2020) the organisation inhabits. The risk spaces can be seen as the combined risk dimensions that affect the operation. These can be physical dimensions such as the weather or road conditions, organisational dimensions such as competence level of the workforce or planning competence, and regulatory dimensions such as the rigour of auditing.

When the organisation sits in a simple risk space that is easily understood and behaves in a linear and deterministic fashion[ix] (Hudson, 2017) the need for investment of time and understanding in the risk culture is low. Most organisations inhabit simple operational risk spaces, though their financial risk spaces may be complex. Thus, a reactive culture is all that is needed.

[4] Heterarchy form of management or rule in which any unit can govern or be governed by others, depending on circumstances, and, hence, no one unit dominates the rest

But if the risk spaces become more complicated, where the outcomes may behave in a non-linear fashion, the organisation will require a more structured approach as the non-linearity means that the outcomes are less obvious. This creates the need for the calculative approach.

When the organisation inhabits risk spaces that are complex rather than just complicated the outcomes can be understood to be both non-linear and non-deterministic. Thus, the organisation has to start controlling in a probabilistic fashion where the variables across the different dimensions are key factors in the management of the probabilities. This requires the dimensions to be managed with the best understanding of the variance of the dimension. This is best done as close to the dimension, thus requiring the locus of control to be moved to the location close to the dimension. This creates the need for a proactive approach.

And when the risk spaces are highly dynamic as well as being complex, the outcomes appear to be not only non-linear and non-deterministic, but also chaotic. This apparent chaos requires swift and effective decision making that requires the actual span of control to change depending on the problem being faced.

In practice

By taking the proposed structural approach to understanding the cultural steps, the different cultures can now be understood in the same way as the purely observational approach that led to the development of the ladder in the first place. We can now see that the appropriate cultural fit is actually defined by the operational risk space the organisation inhabits. Why then do organisations often not have the appropriate culture for the risk spaces they inhabit?
The answer is, of course, that cultures are not a single organism, they are collections of individuals. The organisation will create the culture dependent on their shared understanding of how the world works, their shared causal model. This starts with the senior management and then filters down through the organisation. If the senior management sees the world in a linear and deterministic fashion, then the culture cannot progress. Even if there are requirements for a structured approach using management systems, these will not be used effectively.
If senior management does not have a causal model that operates in a probabilistic fashion, then they will not seek to minimise disruption and move the locus of control.

Changing these shared causal models is a difficult process, and the time needed for changes in how senior management sees the world to filter down to the workforce is considerable. This then also speaks to why cultural change programs take a lot of time. It also speaks to why the cultural change has to start at the top, because as long as senior management does not change their causal model, the organisational structures will not change.

In sociology, culture can be defined by the shared stories and myths that bind a culture together. In safety, culture that can be seen as the shared stories about how and why things go wrong and what they can do to make things work better.

Conclusion

This paper puts forward the idea that the structures that underly safety cultures can be understood in the context of the risk spaces they inhabit, and the interaction of the span and locus of control of the organisation with those risk spaces. These changes in organisational structure are created by the changes in understanding of how the world works by all the individuals in the organisation.

This also means that if the risk spaces that the organisation inhabits are simple, there is no need for large investment in cultural change. This can also be the case for different parts of the operation.

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