

Innovation in the 21st Century: Architectural change, purpose, and the challenges of our time
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Abstract

Understanding the process of innovation has been a central concern of management researchers, but despite this progress there remains much that we do not understand. Deepening our knowledge is critically important given the enormous environmental and social challenges we face as a society. Pursuing incremental innovation will continue to be hugely important, but his paper argues that building a richer understanding of architectural or systemic innovation will also be crucial. This paper suggests that the study of organizational purpose may provide a particularly fruitful avenue for future research.

Introduction

Understanding the process of innovation has been a central concern of management researchers since Schumpeter raised the question of whether large firms were likely to be more innovative than smaller ones or whether entrepreneurial firms were likely to be the fundamental driver of innovation in an economy (Schumpeter 1942). Researchers have continued to explore the role of firm size and structure in driving innovation but have also studied a wide range of additional topics. In the last ten years alone, for example, Management Science has published at least sixty eight papers explicitly focused on the forces that shape innovation. These papers have explored topics ranging from the allocation of control rights, the nature of intellectual property policies, the structure of social networks, the design of innovation contests and the role of unions, alliances, CEO skills – amongst other things -- in driving innovation.

But despite this progress, there remains much that we do not understand. Much of our work to date has focused on the problem of *incremental* innovation -- innovation that is a logical extrapolation of existing ways of doing things. Of course incremental innovation is often a

powerful engines of progress. The explosion in digital technology that has reshaped the world has been driven almost entirely by incremental innovation, most famously through the power of the processes that are embedded in Moore's law. Professor Magnanti's wonderful history of the development of linear programming (this volume) is another illustration of the power of cumulative incremental improvements to generate order of magnitude improvements in performance. He documents, for example, that Linear Programs that took a month to solve in 1988 could be solved in less than a second by 2004.

Pursing incremental innovation will undoubtedly be important in solving many of the social and environmental challenges we now face. For example the recent breath-taking drop in the costs of solar power – solar now costs less than 25% of what it did in 2009 and is now cost competitive with fossil fuels in many regions of the world - has been driven almost entirely by incremental innovation (International Monetary Fund 2019). But to a first approximation the basic design of the solar cell and the core physics on which it rests have not changed in more than twenty years. Progress has come from a steady progression of tweaks – thinner, more efficient coverings, better collection mechanisms, and more efficient installation techniques.

But I suspect that making progress against many of the problems often requires systemic, or “architectural” innovation. Deploying renewable energy at scale, for example, requires a comprehensive rethinking of the power distribution grid – a task that is both highly technical drawing, on many of the optimization techniques pioneered by management scientists, and simultaneously deeply political, since it often requires rethinking the nature of regulation and the balance of power within across the industry. Building a truly circular economy – ensuring that as much of possible of what we build, manufacture and sell is reused or recycled – requires everything from rethinking how we design to revolutionizing how we think about the flow of material throughout our economy. Decarbonizing our transportation system – moving to an entirely renewable powered grid and an electrically powered fleet – opens up the possibility of a whole range of systemic solutions to the problem of congestion. Should a city, for example, be able to coordinate the flow of traffic through its street? Should we think of a world in which every car is rented as needed, and if so how do we optimize loading across an entire fleet or an entire community? In both cases traditional incremental innovation will be incredibly important.

But without the ability to put the pieces of the puzzle together in new ways – to reconfigure the social and technical architecture of the product – we will be unable to realize its full value.

Many of the most significant problems we face cannot be solved through incremental innovation alone. Consider, for example, the problem of climate change. Left unchecked global warming threatens to destabilize the climate, threaten the viability of the world's food supply, flood many of the great coastal cities and force millions of people to migrate (IPCC 2018). Yet emissions of heat trapping gases continue to rise despite dramatic reductions in the costs of carbon free energy sources (Carrington 2019).

Deploying renewable energy at scale requires a comprehensive rethinking of the power distribution grid – a task that requires revisiting not only the technical architecture of the grid but also the business and political frameworks in which it is embedded, since remaking the grid will almost certainly require rethinking the nature of regulation and the balance of power across the power industry. Similarly building a truly circular economy – ensuring that as much of possible of what we build, manufacture and sell is reused or recycled – requires not only significant incremental innovation – can we find a way to reprocess the full range of plastics in use? – but also significantly rethinking the flow of material throughout the entire economy. Should manufacturers design for circularity? Should they be responsible for recycling their products? Who pays for circularity, and how? Decarbonizing our transportation system – moving to an entirely renewable powered grid and an electrically powered fleet – opens up a wide range of systemic questions. If vehicles are autonomous and can be remotely controlled, should vehicles be centrally owned and centrally scheduled? Such a shift could dramatically reduce both congestion and carbon emissions but it raises the question of who should be in control, and what consumers will buy. Should cities, for example, be able to coordinate the flow of traffic through their streets?

The impact of AI and robotics will similarly have systemic effects that will be critically important to manage if the technology is to advance human well-being. How can we balance the promise of tackling problems using the power of “big data” whilst navigating the tricky questions of ownership, privacy and power raised by the centralization and privatization of information. To what degree can these technologies be deployed in ways that ensure they complement labor, rather than substitute for it?

In all these cases incremental innovation will be centrally important. But without the ability to put the pieces of these puzzles together in new ways – to understand how industry need to change and to be able to mobilize organizations to respond appropriately – we will be unable to navigate many of the challenges we face. In short, I think we need to double down on the study of “architectural” or “systemic” innovation, where I define “architectural innovation” as innovation that changes the architecture of a product or a system whilst keeping many of its components relatively unchanged (Henderson and Clark 1990). The concept of architectural innovation was originally developed in the context of the physical architecture of a product. In the case of photolithographic aligners, for example, relatively small changes in individual components triggered a cascade of changes in the ways in which these components interacted with each other that proved to be sufficiently challenging to understand that between 1962 and 1986 new entrants replaced the industry’s leading firm on five separate occasions. But the concept has since been successfully applied to changes in the architecture of entire industries (See, for example, Brusoni et. al. 2009 and Garud et. al. 2013).

The first digital cameras, for example, were essentially conventional cameras fitted with electronic image sensors rather than conventional film. The image sensors were a radical innovation – a complete departure from conventional film – but the fundamental architecture of the camera remained unchanged. It is perhaps not surprising that Kodak – the dominant player in conventional photography – was an early pioneer in the development of digital photography and indeed dominated the market for digital cameras for several years. The inclusion of digital cameras in phones, in contrast, was a significant architectural innovation – changing not only the architecture of the product but also the architecture of the entire industry (Swasy 1997).

In general firms appear to find architectural innovation significantly more difficult to handle than either incremental or radical innovation (the challenge of creating something entirely different). The pursuit of incremental innovation – while never easy – can usually be accommodated within existing organizational structures and patterns of behavior, while it is well understood that radical innovations are best pursued through acquisitions or the creation of standalone entities. Architectural innovation, in contrast, creates problems because it requires access to the organization’s current assets and skills whilst simultaneously requiring that both be reconfigured into quite different patterns. In most organizations the focus of attention is on “component”

knowledge – knowledge of how particular pieces of the puzzle work – while “architectural” knowledge – knowledge of how the pieces are put together -- often becomes embedded in the tacit routines, structures and processes of the organization - in things like the mental models of its employees, in patterns of communications and in incentives that reinforce particular patterns of attention in ways that make architectural knowledge both difficult to access and resistant to change. In most firms most people know a great deal about their own jobs, but relatively little about exactly what goes on elsewhere in the organization.

Despite its importance, we know relatively little about how to handle this kind of innovation. Significant progress has been made in understanding how to create the organizational structures and governance routines that can increase the odds of mastering architectural innovation within individual firms (See, for example, work by Tushman and O’Reilly 2002). But our knowledge of how firms can help support the kinds of systemic, industry wide transformation inherent in, say, greening the world’s transportation systems is still radically incomplete (Gans 2016).

What might further research in this space look like? How can we go about learning how to support firms in handling these kinds of complicated, interrelated problems in a world in which it is always easier to study the components than the architecture? Here I sketch out a way of thinking about these kinds of problems that I hope might be helpful, focusing particularly on the ways in which building a better understanding of the role that “purpose” and the ability to build “relational contracts” might play in making it easier to handle architectural change.

Purpose and Innovation

My working intuition is that there may be particularly high returns to focusing more attention on the so called “softer” aspects of management. This is a suspicion that flows from my own research. I have spent more than twenty years studying the problem of architectural innovation in a wide variety of firms, and have come to believe that the single most important determinant of whether a firm is able to master it successfully is its commitment to a shared purpose, or to a goal beyond simple profit maximization.

What does it mean for a commercial firm to have a “purpose”? There are almost as many definitions of purpose as there are papers about it in the literature, but as a first step let me

suggest that a company is purpose driven if it is publicly committed to a goal beyond profit maximization, and if it routinely sacrifices short term profits to the pursuit of this purpose. This is not to suggest that the embrace of purpose necessarily implies accepting lower levels of profitability in the long run. As I will argue below, there is good reason to believe that the embrace of purpose brings with it a range of advantages – particularly with respect to the pursuit of innovation -- that are often sufficient to compensate for the cost of having a purpose in the first place.

Why might the embrace of purpose increase a firm’s ability to innovate – and in particular, to enable it to tackle architectural or systemic innovation significantly more effectively than its more conventional rivals? My own research and the literature suggests three broad hypotheses.

Purpose drives both Vision & Alignment.

An extensive literature suggests that managers are deeply constrained by the “frames” or “schemas” through which they see the world and that shape their diagnoses of strategic opportunities and threats (See, for example, the review in Kaplan (2011). Path breaking studies of strategy formation in photography (Tripsas and Gavetti 2000) and in internet software (Gavetti and Rivkin 2007) suggested that in both cases deeply held mental models made it difficult for the senior team to respond effectively to the transformations that were reshaping their business.

A less developed stream of research further suggests that managers who embrace a widely shared pro social purpose may be better positioned to identify new opportunities because this purpose leads them to take a more expansive view of the world and to see opportunities that others may miss. The psychologist Robert Kegan, for example, suggested that exceptionally highly psychologically developed individuals possess what he called a “self-transforming” mind – the ability to see and to act on the knowledge that people are mutually interdependent and that our behavior is shaped by the systems in which they are enmeshed. His work can be read as suggesting that these kinds of individuals are more likely to be able to see systems as malleable and to be able to imagine systemic transformation (Kegan 1982).

The embrace of a shared purpose also plausibly increases strategic alignment across an organization, ensuring that the strategy of the firm is widely understood and that the firm's structure and processes are designed to support it. Shared purpose may embed shared views of the world in organizational rituals and widely accepted ways of behaving that together make certainly patterns of behavior both widely acceptable and "natural". (Krepps 1990; Cremer 1993; Schein 2015).

As strategy scholars have stressed since Chester Barnard (1968), organizational and strategic alignment can also increase the odds that units, teams, and individuals understand how their respective contributions contribute to the firm's performance, allowing employees to spend less time managing conflicting objectives or navigating cumbersome organizational barriers and instead concentrating on executing tasks more effectively (Baron and Kreps 1999; Kaplan and Norton 2005; Van den Steen 2010a,b).

Does purpose in fact lead firms to identify opportunities that others do not and to greater strategic alignment? The empirical work in this area is still at a preliminary stage. Tushman and O'Reilly, in a richly detailed series of case studies of firms that have successfully navigated major architectural transformations, find that a strong sense of shared purpose plays a central role in identifying new opportunities – and in building alignment across the organization on the need to address them and on the means by which to do so {O'Reilly and Tushman 2016}. My own experience with successful transformational leaders similarly suggests that a commitment to a purpose beyond simple profit maximization often alerts them to opportunities for profitable new businesses that others fail to see (Henderson 2020). Gartenberg, Prat and Serafeim (2019) present compelling evidence drawn from more than 5 million employee surveys to suggest that when purpose is closely connected to the strategic goals of the firm it is correlated with financial performance. So there's reason to believe that there's something going on here but much that remains to be understood.

Purpose and engagement, effort and creativity

In general people will work hard for money, status and power – so called "extrinsic" motivators. But for many people, once their core needs are met, the sheer interest and joy of the work itself –

“intrinsic” motivation – is much more powerful (Deci and Ryan 1999; Cerasoli et al 2014). There are a number of mechanisms through which the adoption of a shared purpose plausibly increases the odds that employees will be intrinsically motivated. The embrace of an authentic purpose increases the odds that one’s work has *meaning*, one of the core drivers of intrinsic motivation and a driver of higher quality, more creative work (Pink 2011). It can also create a strong sense of shared *identity*, another important source of intrinsic motivation (Akeloff & Kranton 2005; Henderson & Van den Steen 2015). To the degree that shared purpose supports genuine authenticity – the ability to live a life in accord with one’s deepest value – it also increases the presence of positive emotions – something that is strongly correlated with the ability to see new connections, to build new skills, to bounce back after difficult times, and to be more resistant to challenges or threats (Amabile 2005; Lyubomirsky et al. 2005; Boiral et. al. 2009;). This is an enormous literature and I cannot possibly summarize it here. The Oxford Handbook of Positive Organizational Scholarship, for example, includes seventy nine chapters on topics as diverse as resourcefulness, spirituality, appreciative inquiry and organizational energy (Cameron, Kim and Spreitzer 2012.) Much of the research uses methods that may be unfamiliar to readers of Management Science – but it is deeply thought provoking and taken together suggests, I believe, that the employees of purpose-driven firms are likely to be significantly more productive, happier and more creative than those at more conventional ones. All of these qualities plausibly make it easier to embrace architectural innovation.

Purpose and Trust

The twin ideas that shared purpose might increase trust – and that in turn, the presence of trust is correlated with the ability to tackle architectural innovation – are much less developed in the literature. An abundant literature suggests that trust is correlated with performance (See, for example, Bachmann & Zaheer 2008 and Edmondson 1999, 2014). But this stream of work has not – so far as I am aware – explored either the ways in which shared purpose might support the development of trust or the mechanisms through which trust might enable the pursuit of architectural innovation. What follows should therefore be taken as speculation or hypothesis development rather than established fact.

My belief that purpose might drive the trust that might in turn drive the ability to handle complex, systemic problems is rooted in a close engagement with the literature that has explored the nature and effects of what is sometimes called the Toyota Production System or, more broadly, ‘high performance work systems’.

An extensive body of research has demonstrated that there are persistent performance differences among seemingly similar enterprises (Bartelsman and Doms 2000 and Syverson 2011). For example Syverson (2004a) found that within 4-digit SIC [Standard Industrial Classification] industries in the U.S. manufacturing sector, the average difference in logged total factor productivity (TFP) between an industry’s 90th and 10th percentile plants was 0.651, or that the plant at the 90th percentile of the productivity distribution made almost *twice* as much output *with the same measured inputs* as the 10th percentile plant. These findings have been replicated in a wide range of time periods and geographies (Dwyer 1998; Disney et al. 2003, Eslava et al. 2004; Gibbons and Henderson 2013). They are surprisingly robust to controls for competition (Syverson (2004b), for the measurement of output in physical units rather than in revenue (Foster et al 2008), and for problems of selection and simultaneity (Olley and Pakes 1996, Van Biesebroeck 2008).

The question of what precisely *causes* these performance differences remains hotly contested, but there is increasing evidence that one important source is persistent differences in management practices. A long tradition among labor economists and others studying blue-collar work has suggested that “high-performance work systems” are closely correlated with superior organizational performance (e.g., Kochan et al. 1986; Macduffie 1995; Macduffie et al 1996; Huselid 1995; Huselid & Becker 1996; Ichniowski et al. 1997, 1999; Appelbaum 2000, Black and Lynch 2001; Ichniowski and Shaw 1999; Gant et al. 2002; Boning et al. 2007; Hamilton et al 2003.) These largely micro and industry level studies have recently been supplemented by an important research program pioneered by Nicholas Bloom, John Van Reenen and their collaborators that draws on survey data obtained from thousands of plants across many countries to confirm that a very significant fraction of the variance in productivity across plants and firms is driven by variation in the adoption of management practices (Bloom and Van Reenan 2007, 2010, 2011, Bloom et al 2010.)

There is no single definition of “high-performance work system,” but three overarching elements can be identified in the literature. In general, firms with high-performance work systems use high powered incentives, pay a great deal of attention to skills development, and do everything they can to support dense communication and local problem solving. Table 1 lists some of the particular practices identified by some of the key studies in the field.

Table 1: Management practices underlying high-performance work systems

| Practice ¹ | Appelbaum (2000) | Ichniowski et al. (1997) | Bloom and Van Reenen (2007) | Macduffie (1995) | Pfeffer (1998) | Huselid (1995) | Black and Lynch (2001) |
|--|------------------|--------------------------|-----------------------------|------------------|----------------|----------------|------------------------|
| <i>High-powered incentives</i> | | | | | | | |
| Incentive pay | X | X | X | X | X | X | X |
| Employment security | X | X | X | | X | | X |
| Merit-based promotions | X | | X | | | X | |
| Reduced status distinctions | X | | | X | X | | |
| Performance review | | | X | | | X | |
| <i>Skills Development</i> | | | | | | | |
| Skills training | X | X | X | X | X | X | X |
| Selective recruiting | X | X | X | X | X | X | X |
| Flexible job assignment | X | X | | X | | | |
| <i>Dense communication and local problem solving</i> | | | | | | | |
| Teamwork | X | X | X | X | X | X | X |
| Communication | X | X | | | | | X |
| Information sharing | X | | | | X | X | |
| TQM/Process Control | | | X | X | | | X |

Source: Gibbons, Robert & Rebecca Henderson "What do managers do? Exploring Persistent Performance Differences among Seemingly Similar Enterprises" " Chapter 17, pages 680-731 in The Handbook of Organizational Economics, Robert Gibbons and John Roberts, Editors, Princeton University Press, Princeton and Oxford, 2013

¹ These practices are not necessarily mutually exclusive. For instance, some authors specifically focus on the importance of communication and information sharing in developing well-functioning teams, others directly measure the use of such teams, while still others measure a specific type of team that might be used in lean manufacturing, total quality management programs, or statistical process control. These may all be capturing similar successful work practices.

But these results raise another, even more puzzling question, namely, why don't they diffuse? At first glance, it seems unlikely that differences in managerial practices could drive performance since they have been extensively documented and would appear to be relatively easy to adopt. For example the Toyota Production System, an early and spectacularly successful instantiation of a high performance work system, has been explored in hundreds of books and thousands of academic articles. If the adoption of these work practices can make such a difference to performance, why don't they diffuse more quickly?

One possibility is that managers simply don't "see" that they are behind. We know that the cognitive frames of individual managers and the ways in which information processing is structured within the firm may lead firms to have quite different perceptions of their environments and the capabilities of their competitors (Kaplan et al. 2003, Kaplan 2011). In addition much of the knowledge fundamental to building management practices is "tacit," or deeply embedded in individuals or organizational routines, so it is simply unclear how to mimic a high-performer (see, for example, Zollo and Winter, 2002). Several studies suggest that management practices are much easier to "learn" if one has access to individuals who have experienced them first hand (Breschi and Lissoni 2009; Lacetera et al. 2004; Bloom et al. 2012).

Another possibility is that managers fail to adopt better practices because they are insufficiently incentivized to do so, and the Bloom et al sequence of papers do indeed find that family owned firms and firms in less competitive environments adopt leading edge practices slower than their rivals. But none of these explanations can account for those cases in which managers know about the new practices, are convinced that they would be effective and have strong incentives to adopt them. General Motors, for example, took nearly twenty years to respond effectively to Toyota's entry into the US market, despite the fact that they had a joint venture with Toyota that gave them deep insight into Toyota's practices (Helper and Henderson 2014).

Gibbons and Henderson (2013) argue that one of the reasons these kinds of implementation failures arise is because the adoption of high performance work systems requires the development of deep levels of trust across the organization – or on the development of "relational contracts" – contracts predicated on subjective metrics that can only be enforced by the shadow of the future. For example, one important source of the extraordinary levels of productivity and quality obtained by Toyota in the late 1980s and the 1990s was the firm's

ability to make continuous improvements to its production processes. Shop-floor workers were grouped into problem-solving teams that were encouraged to identify bottlenecks and inefficiencies in the production process and to explore potential solutions to them. Workers were asked to be alert for potential opportunities for improvement and to be creative and innovative in their search for solutions. Gibbons and Henderson argue that successful participation in these kinds of activities relied on a set of behaviors that could not be articulated *ex ante* or verified *ex post*, and hence could not be rewarded through a formal contract, and that this made them almost impossible for Toyota to imitate (see also Henderson and Helper 2014)

The idea that the presence of “relational contracts” – contract that rely on subjective measures enforced through the shadow of the future, rather than through the courts -- might improve performance is well established in the literature, but we have much less understanding of why new relational contracts cannot simply be “declared”. Why could GM not just announce that they had recently learned that high levels of mutual trust would increase performance, and that therefore from henceforth they had decided to perform in a trustworthy manner? An intriguing sequence of recent papers that model the conditions under which a relational contract develops suggest that if the subjective measures on which they must be built can only be communicated over time, relational contracts can only be built through shared experience (See, for example, Chassung, 2010 and Halac 2012 and also Adler 2006 and Zaheer 2008).

I believe that these ideas are consistent with the idea the adoption of authentic purpose greatly accelerates the adoption of high performance management practices because the presence of purpose greatly increases the ability to build trust – and hence relational contracts – within the organization. Gibbons and Henderson (2013) speculate that it is useful to think of the development of relational contracts as being predicated on the development of “clarity” and “credibility” – where clarity is a shared set of beliefs about the nature of the world, the strategy of the firm and the likely effects of a set of plausible actions on possible outcomes, and “credibility” is an informed belief that – all other things equal – the parties to the relational contract are likely to live up to their commitments.

As I have explored above, there are good reasons to believe that the adoption of shared purpose increases clarity within the organization, and I think it is also plausible to assume that it increases credibility. Purpose driven firms are more likely to attract pro-social individuals, and it is much

easier to build cooperation when some significant number of the parties involved have a positive preference for cooperation (Moorman and Blakely 1995; De Cremer and Van Lange 2001). Similarly firms can only build a reputation for being authentically purpose driven if they deeply embed their purpose in the strategy and processes of the firm, and if they consistently show themselves to be willing to accept lower returns (at least in the short term) in its service. All of this feels like the kind of demonstrable commitment to “doing the right thing” that is likely to build credibility. In short, I suspect that purpose may play an important role in enabling the adoption of high performance work practices.

Here again the empirical evidence as to whether this is indeed the case is more intriguing than definitive. Zeynep Ton, who has studied the adoption of high performance work systems in retail, argues that shared purpose may be an important complement to their success, citing the experience of firms like Mercadona and CostCo as evidence (Ton, 2014). Scholars who study Toyota often stress the fact that Toyota’s culture is central to the successful working of the Toyota Production System (Ledbetter 2018; Liker and Hoseus 2008). In my own experience, firms who have succeeded in adopting high performance work systems are nearly always run by senior teams who have at the very least committed to the idea that the well -being of their employees is at least as important as maximizing profitability (Henderson 2020). But this an area ripe for more systematic research.

Of course making the case that shared purpose makes the development of the trust that makes the adoption of high performance work systems possible is not the same thing as making the case that this kind of trust is likely to make tackling architectural innovation easier. But here again I believe it to be a plausible hypothesis.

The relational contracts that support high performance work systems are by their very nature deeply ambiguous and very much subject to interpretation. the case of Nordstrom’s employee handbook, which for many years was a single sheet of paper on which was written:

Welcome to Nordstrom

We're glad to have you with our Company. Our number one goal is to provide outstanding customer service. Set both your personal and professional goals high. We have great confidence in your ability to achieve them.

**Nordstrom Rules: Rule #1: Use good judgment in all situations.
There will be no additional rules.**

Please feel free to ask your department manager, store manager, or division general manager any question at any time.

They meant it. Nordstrom is in the retail business, and built an impressive track record on the basis of employees who “used good judgment.” In a series of famous cases, one sales associate accepted the return of snow tires (Nordstrom does not sell snow tires), another drove for hours to deliver a set of clothes so that a customer could attend a family occasion, and a third changed the tires of customers stranded in the company parking lot. Stories like these gave Nordstrom a reputation for excellent customer service that was the envy of its competitors and that created deep customer loyalty. (And yes, for many years Nordstrom has been regarded as a highly purpose driven organization.)

Tackling architectural innovation requires precisely the ability to deal with this kind of ambiguity – to be able to tell employees to “do the right thing” – even when there’s no easy way to credibly commit to rewarding them if they do. We know from years of research that firms who master architectural innovation are “ambidextrous” – that is, that they combine the ability to manage conventionally operationally focused organizations with much more dynamic, faster moving units – and that this ability is rooted in the ability of the senior team to develop shared understanding of the world and of the firm’s strategy, to communicate this to the rest of the organization, and to manage the organization through a judicious mix of subjective and objective measures that must be constantly revisited (See, for example, Tushman and O’Reilly 2002). In short, managing architectural change requires the ability to build and modify new relational contracts on the fly – something that is likely to be, I believe, much easier in an organizational characterized by authentic purpose.

Complements?

In short, authentic purpose seems likely to increase the odds that the organization will “see” the need for architectural innovation as it emerges, that it will develop a shared sense of strategy and an organization aligned against that strategy, that its employees will work harder – and be significantly more engaged and productive than those in conventional firms – and that it will have an advantage in developing the trust that is essential to effective action under ambiguity. (See Figure (1) and Table (2) for an overview of the linkages I have outlined above.).

What is the evidence that this is indeed the case? There is a large and lively debate as to whether the quantitative evidence suggests that the adoption of a ‘purpose’ is correlated with improvements in financial returns (See, for example, the excellent summary in Edmans 2020, and the research available at <https://www.unpri.org/academic-research/top-academic-resources-on-responsible-investment/4417.article>). But for my purposes here this is not a useful debate. In the first place, I suspect that if the adoption of purpose were obviously correlated with financial performance we’d see a lot more of it. In the second, I’m much more interested in the degree to which purpose might drive the ability to innovate – particularly in the face of architectural or systemic innovation – something that may or may not be systematically correlated with financial returns -- and here again I can’t offer much beyond qualitative evidence.

Research in “transformational leadership” contrasts transformational leaders – leaders who internalize purpose, reinforce collective commitment, build common interests, and change the way that followers see themselves – with transactional leaders – leaders who are motivated primarily by self-interest and appeal to followers’ self-interest through incentives (Kaiser et. al 2008). This literature suggests that because transformational leaders have a strong set of internalized values, they make exceptional managers that can help the firm navigate short-term versus long-term pressures and manage the balance both social and financial responsibilities (Boiral et. al. 2009). These qualities also serve to inspire other employees to identify with the firm’s purpose and to cooperate in pursuit of organizational goals which in turn leads to improved performance (Kuhnert & Lewis 1987). The presence of authentic leadership has been correlated with performance in retail (Clapp-Smith et. al 2009) and in technology firms (Peterson et al 2008) – and the idea is consistent with an intriguing literature that suggests that the qualities I have identified – meaning, identity, authenticity and pro-sociality – are complements in driving

performance (See, for example, Clapp-Smith et al 2009; Grant 2008; Grant and Berry 2011; Ling 2008; but here again performance is often measured as financial performance, rather than as a superior ability to innovative.

Which is by way of ending – as you might expect – in a call for further research. We will not solve the massive global problems we face without being able to catalyze great waves of architectural innovation. Developing a deeper understanding of the forces that enable firms to move in this direction is thus potentially of enormous value. I am not suggesting that we abandon profit maximization or the tools of quantitative analysis. But I have come to believe that a richer focus on issues that have historically been considered “soft” – and in particular on questions of meaning and purpose and how they might shape organizational capability -- might pay off handsomely in both refereed journal articles and truly useful knowledge.

What might research in this area look like? Clearly there will always be a role for the kind of detailed, qualitative studies of particular firms and single industries that have always been central to work in innovation. I suspect that longitudinal studies exploring the development and roll out of electric vehicles and renewable energy, for example, may prove to be particularly fruitful. Similarly, studies of the public/private partnerships that are emerging to tackle problems such as labor conditions in the supply chain and the continuing challenge of deforestation -- and the slew of innovations they are attempting to coordinate in response -- are also likely to yield important insights.

But I suspect that these issues are also amenable to more conventional modes of research. Research in behavioral economics is increasingly demonstrating that human motivation is much more complex than many classical models assume. Might it be possible to bring some of these methods into field settings to explore the degree to which so called purpose driven firms do indeed succeed in changing the perceptions and motivations of their employees? Advances in textual analysis applied at scale are increasingly generating new measures of the “culture” of organizations and the ways in which work is structured. Could they be applied to track the evolution of culture over time, potentially exploring the interaction between the adoption of purpose by a senior team and its diffusion – or not – within an organization? Could both be combined with additional measures to explore the degree to which they help drive innovation?

Let me close by making the case for taking more risks in our professional lives. Doctoral students are told to focus, to pick problems that are well-bounded and that are likely to advance the state of the art. They are also taught the process of research is a deeply ethical endeavor – that a commitment to truth and to the good of the community is fundamental to the progress of science. But in general those of us who are more established don't spend much time encouraging them to think through the broader consequences of the work they do, or suggesting that they choose problems not only for their inherent interest and tractability but also because they offer the opportunity to tackle our most pressing problems. Perhaps we should.

This is not a matter of losing our analytic selves. This is a matter of integrating into our analytics the awareness that humans are driven by much more than short term interest and by much more than simply money and power – and by the recognition that tapping into this kind of motivation may have significant effects on behavior. If we can help firms harness this additional motivation, we can perhaps help them take more risks – and in so doing increase the odds that they will innovate in the ways we so desperately need as a society to deal with the problems that we face.

I don't believe – of course – that private sector action will be enough so solve problems like climate change or inequality. But I suspect that purpose driven firms may have the ability to catalyze transformational change across industries and regions – and perhaps even at the national and global scale (See Henderson 2020).

Tom Magnanti's paper in this volume is emblematic of the power of mathematics and analytics and the enormous difference it has made in advancing human well-being over the last 50 years. In the next 50 we must double down on everything we know about quantification and careful research. But I believe we need to combine it with a larger concern for human flourishing and human well-being, and with an increasing sense of the power of unfamiliar concepts such as purpose, trust and meaning if we are to make the kind of difference we need to make.

Let's do the research that helps firms change the world.

Figure 1: Links between Purpose and Performance

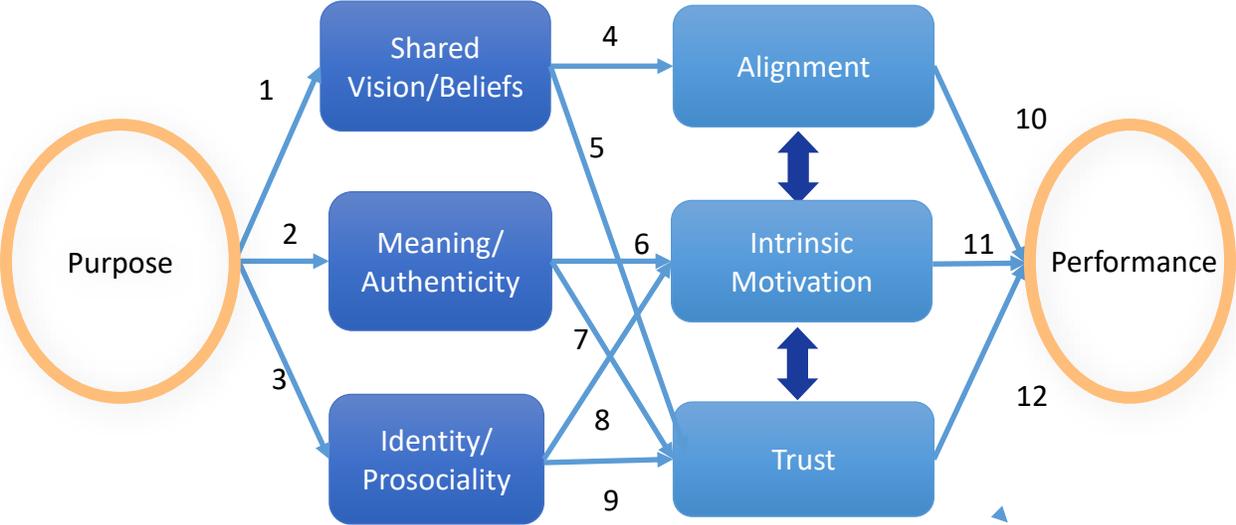


Table 2: Unpacking Purpose

| From | To | Link | References |
|-------------------------|-------------------------|------|--|
| Purpose | Shared Beliefs | 1 | Van den Steen, 2010a |
| | Authenticity & Meaning | 2 | Kaiser et. al 2008; Boiral et al 2009 |
| | Identity & Prosociality | 3 | Akerloff & Kranton, 2005; Henderson & Van den Steen, 2015; Fehr & Fishbacher, 2002 |
| Shared Beliefs | Alignment | 4 | Krepps 1990, Rotemberg and Saloner, 2000 |
| | Trust | 5 | Gibbons & Henderson, 2013; De Cremer & van Lange, 2001 |
| Authenticity & Meaning | Intrinsic Motivation | 6 | Deci and Flaste, 1995; Ryan and Deci, 2000, 2004; Zhu, May and Avolio, 2004 |
| | Trust | 7 | Van Lange & Liebrand, 1991; Moorman and Blakely, 1995; Henrich et al, 2001 |
| Identity & Prosociality | Intrinsic Motivation | 8 | Henderson & Van den Steen, 2015; Kimberly et al., 2007; Deci and Flaste, 1995; Deci and Ryan, 2001; Grant, 2011, Pink 2011 |
| | Trust | 9 | Tyler 2001; Henrich et al, 2001 Moorman and Blakely, 1995 |
| Alignment | Performance | 10 | Baron, J. & Kreps, D. 1999, Kaplan, R., and D. Norton. 2005; Baetz and Kenneth, 1998; Desmidt, Prinzie and Decramer, 2011 |
| Intrinsic motivation | Performance | 11 | Deci and Flaste, 1995; Ryan and Deci, 2000, 2004; Cerasoli et al (2014) Osterloch and Frey (2000) Teigland and Wasko (2006) Mudambi (2007); Gyzzo, Jette and Katzell, 1985 |
| Trust | Performance | 12 | Gibbons and Henderson, 2013, Edmondson (1999); Baer and Frese (2003); |

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