Original Article

Application of Systems Thinking to Create Innovation Using Enterprise Teams

Dr. Julia Taylor

Taylor Success Systems, California, United States of America (USA).

Abstract: *Innovation is a huge challenge for companies, particularly those that rely on having state of the art products in order to stay in business. Those teams that incorporate Systems Thinking (big picture thinking) into their working processes are the teams that are effective when it comes to implementing new innovation. These teams have to plan and coordinate with many other departments, both before and during the implementation process. They can only do this effectively by being able to take different perspectives and integrate those perspectives into the overall strategy of the company going forward. This presentation will focus on the leadership qualities and behaviors required at different stages of innovation and how these involve cross-functional teams and the organization as a whole.*

Keywords: *Attitudes, Behaviors, Business Development, Change Management, Corporate Leadership, Cross-functional Teams, Innovation, Leadership Approaches, New Product Development, Perspectives, Qualities, Systems Thinking, Teams, Teamwork.*

I. INTRODUCTION

Systems thinking are big picture thinking. Typically, companies have traditionally required employees to focus on their own function and have not wanted them to engage in other types of thinking or activities that might distract them from doing their jobs in the most efficient way. However, as the world speeds up and increases in complexity, this situation is changing. Now everyone needs to keep in mind what the overall goals are as well as the longer term goals of the organization.

This couldn't be truer than when it comes to innovation. Technology based companies in particular, must innovate or die. According to Professor Clayton Christensen, 95% of all product innovations fail. Van Wulfen (2016) found that modern innovation efforts fail 96% of the time. A recent report by the Boston Consulting Group found that 75% of companies are making innovation among their top three priorities. However, BCG does not think most of them are prepared to implement it.

An article in a 2023 issue of Journal of Change Management showed that a majority of middle managers in more than 650 international organizations found their business environment to be complex, dynamic and even chaotic. These managers reported that the change approach that 70% of their organizations used was a "planned strategy". However, 75% of these managers indicated that their organization's change strategy was not adequate and moreover, they expected that the targets set by top management would not be achieved. Boonstra highlights the importance of innovation in order for firms to successfully adapt in dynamic, unpredictable environments. (Boonstra, 2023)

The way innovation gets implemented within an organization is through the use of cross-functional teams. From the very start, when a new innovation is no more than an idea, it must involve people from various parts of the organization if it is to have a chance to succeed.

II. METHODOLOGY

The qualitative method was employed to support the author's proposed model for innovation. Research was conducted using Google Scholar, ABI Inform, and other databases were used to locate research materials. Anecdotal evidence, and actual case studies were used to illustrate the author's proposed model for implementing innovation.

III. DISCUSSION AND RESULTS

Key Systems Thinking Principles include taking the big picture into account, considering the context of a project, incorporate consideration for the interaction between key components including those of the People, the Organization, and the technology, consideration of the flow of ideas, decisions and activities and the timing of key events. These principles impact the

process of designing, creating, developing and maintaining systems. Systems Thinking Principles serve as a high level guide for major endeavors such as pursuit of new innovation.

A. Systems Thinking Principles
- The Big Picture
- The Context of a Project
- The Interaction Between Key Components (People, Organization, Technology)
- Flow of Ideas, Decisions, & Activities
- The Timing of Key Events
- Impact the Process of Designing, Creating,
- Developing, & Maintaining Systems

Today my focus is on presenting a semi-structured approach to implementing innovation. However, it is important to note that in many situations the beginning of such an endeavor involves a lot of gray areas that my approach does not adequately address. Many times people know that innovation and change are needed, but there isn't a clear path for achieving it. Kowal, et al (2023) did a study related to management agility that involved a Pro-innovation Behavioral Profile. It was used to help managers get their people develop ideas and new projects, as well as planning and detecting opportunities in a dynamic context. It helps managers to become aware of the potential of their people and develop incentives to develop that potential. The study found that the most supportive dimensions for innovative behavior are Organizational Environment and Transformational Leadership. The value in using a Pro-innovation Behavioral Profile is in helping managers set the stage for innovation. It's about creating a supportive environment that allows for innovation to emerge.

Another study from 2022 in the Journal of Knowledge Management involving 331 employees from 29 new product development teams across 18 Chinese firms in five high-tech industries had some interesting results regarding leadership and the cultural environment. It showed that leadership support and shared culture contributed negatively to knowledge-seeking efforts of employees. This is, of course, terrible for innovation because innovation is all about knowledge-seeking efforts.
Perhaps, their leadership is a bit too "command and control" oriented. The good news is that these companies now know that they need to incentivize their new product development teams and improve their leadership and cultural environment. (Zhang, et al, 2022)

Boonstra (2023) includes innovation within a "change management" perspective. What I like about his proposal is that it offers a very open structure for collaboration and exploration regarding future projects of the organization. In the beginning, there may not be an obvious context for pursuing new innovation. His approach might allow such a context to be created through collaboration with key people throughout the company. Although it's not really fully addressed in this study, methods to help with "readiness for innovation", such as those just mentioned, are very important for organizations going forward.
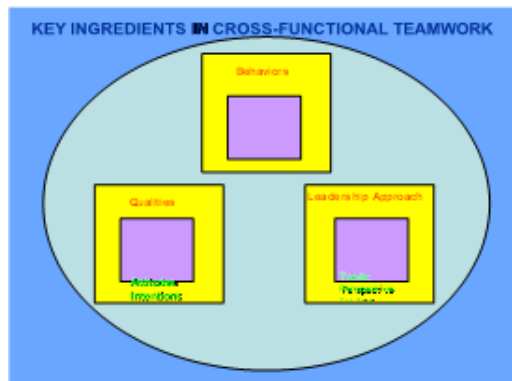

Figure 1: Key Ingredients in Cross-Functional Teamwork

There are three key ingredients for cross-functional teamwork: behaviors, qualities and leadership approaches. (See "Key Ingredients in Cross-Functional Teamwork") What's behind these key ingredients gives power and life to these ingredients. The thing is that if you as a team player make these your top priority, then your team will have remarkable energy in terms of resilience, creativity and zeal. Even if you don't think you have very many qualities that make a good team member, but you

want to be a good team member, having the right attitude and intention will take you far. Human beings are remarkably adaptable and capable of continuous learning.

Most people on a team know what behaviors are needed for success, but what is important is how well they are motivated to do those actions. Whatever it takes to have a highly motivated team, is worth pursuing. Innovation requires leadership. There are tools that help leaders to be effective. One of these tools is Perspective- Taking which is about taking on the perspective of another person deliberately. By doing this, team members are able to see where the gaps are in their thinking, and then integrate their perspectives together so that they have a direction in which to move. This is very important for leaders, so that they can get the team moving.

Figure 2: Commercial Results, Often a New Product Produced by the Organization

Innovation is all about producing a commercial result, something that can be sold in the marketplace. (See "Innovation" visual.) In the beginning it may seem a bit fuzzy the difference between an invention and an innovation because the team is kind of inventing the innovation. In other words, there has to be a lot of development work done in order to translate an invention into a prototype that would be useful for an actual customer. Then, after that, making the leap from there to a product that can be economically produced by a company that will result in profits for the company, is yet another big hurtle. Innovation is challenging.
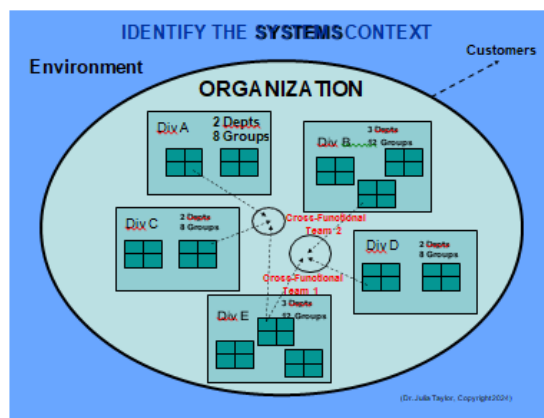

Figure 3: Systems Context

The first thing that's important when it comes to innovation is identifying the systems context. This requires creating a new context for working together, which did not exist in the organization prior to forming cross-functional teams. (See "Identify the Systems Context" visual.) Neither a working group, department, division, organization, nor the competitive environment provides the context that the cross-functional team provides. It is a special Systems-wide team that has the potential to transform the organization as a whole. Considering the context is important, because the goals, perspective, values and focus is different for each situation. What matters for a working group within a department is very different from what matters for a cross-functional team.
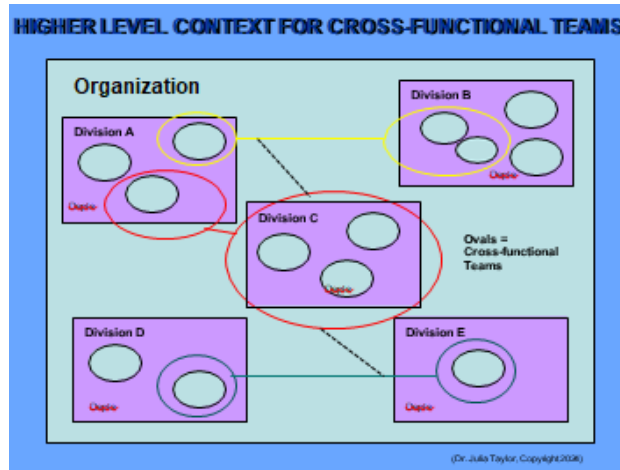
Figure 4: High Level Context for Cross-Functional Teams

As innovation progresses in the organization, more and more cross-functional teams are formed at different levels for different purposes. (See "Higher Level Context for Cross-Functional Teams" visual.) Eventually, there will be cross- functional teams that span different divisions. Then those cross-functional teams will be connected.

This means that for the purpose of initiating a new innovation, the typical organizational structure and hierarchy is being bypassed and is no longer the focal point for these teams. They care very much about the typical organizational set-up, but are able to superimpose another type of organizational flow on top of it what is the process for implanting a new innovation into an organization? My belief is that when new innovation involving a technology change, happens in the most ideal manner, it starts with a very small innovation team. Sometimes it starts with a single individual who champions the new innovation and then when it seems promising, forms an innovation team. The innovation team then works autonomously, in isolation from the rest of the organization, often in kind of a "skunkworks" environment. This allows for the kind of intense concentration and focus that is needed to turn an invention or a good idea into a true innovation possibility.
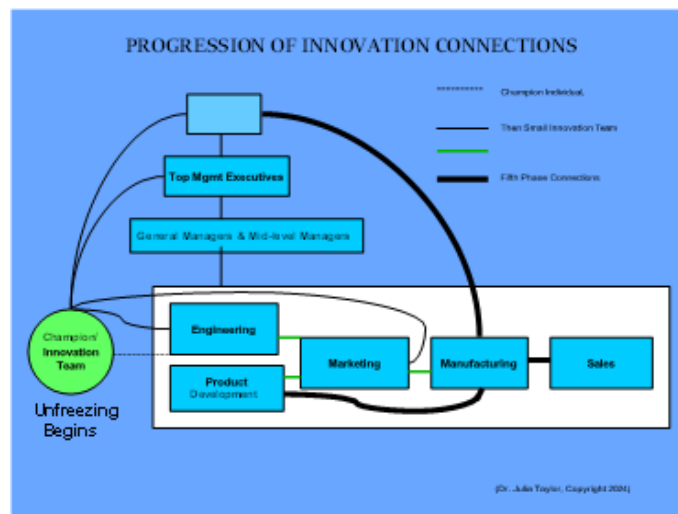

Figure 5: Progression of Innovation Connections

In the beginning, the champion may only be connected to the Engineering Department, for instance. After that, once the small innovation team is formed, it may be connected to the CEO and top management plus marketing and engineering. It is important that the innovation team is connected to the CEO and upper management because a broad scope and a Systems Thinking perspective is needed in order for the proper unfolding of events to happen later. Those that are thinking about the organization as a whole must be brought in early on because they can impact the shape of the development process and insure that it is in alignment with Corporate Strategy.

Then Engineering, Product Development, Marketing and Manufacturing are connected so that what is eventually given to production can actually be manufactured, marketed and sold. Marketing has to prepare for the new offering. Manufacturing has to make sure that their equipment will be able to produce the new product and that any additions, changes or alterations can be made to prepare for its production. This is a big step that involves creating many cross-functional teams that will work together with the original innovation team.

After prototypes have been proven to work, the CEO and upper management make a decision to invest substantially in the new product and take a big risk. It is at this point that the organization is committed to the new technology and the new product being produced as a result. (See "Progression of Innovation Connections" visual.) Cross-functional teams play a huge role in getting such a new technology innovation to happen. These consist of different types of teams at different points along the way during the process. Next, I am going to describe some of these and talk about the qualities, behaviors and leadership approaches that are needed in order for them to be effective.

It's important to keep in mind the Systems context or the Systems of Systems context. Each cross-functional team operates within the organization as a whole, within their division, within their specific department and/or across several departments. Different goals exist in each of these instances, so it is crucial that the various goals are aligned with the overall organizational strategy. Therefore, being able to view teams within each of these various contexts provides different perspectives that are useful for moving the goals forward and achieving strategic objectives. The key is to pay attention to timing, make sure the priorities and focus of each team makes sense and integrates various goals in order to streamline the output.
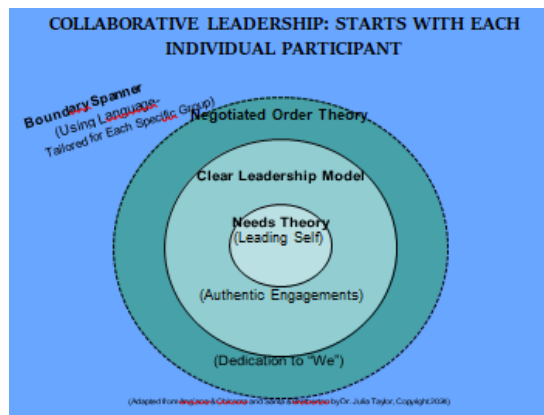

Figure 6: Collaborative Leadership: Start with Each Individual Participant

At the heart of this process is the cross-functional team member. These are the heroes that actually make this happen the innovation leaders. They are boundary spanners who connect various functions with their functional counterparts as well as connecting to their cross-functional team members. They are very gifted because they can speak the language that each of these entities uses and therefore are able to communicate at a deeper level than others can do. This means that they are likely to engender connections that have an impact.

Each team member has qualities and behaviors that make them particularly suited to collaborative leadership as defined by three theories. (Ang'ana & Chiroma, 2021) The Three Needs Theory supports leading self, which is a prerequisite for leading others. It postulates that people are motivated by *achievement*, *power* and *affiliation*. Leaders can identify how others are motivated and influence them according to their propensities.

A. The Clear Leadership Model Involves Four Critical Skills:

Self-awareness which allows an individual to be aware of their "in the moment" experience, *the descriptive self* which allows an individual to share experiences with others as well as allowing others to share their experiences with them, *the curious self* which is about exploring viewpoints of others to gain greater understanding about where they are coming from, and finally *the appreciative self* which is the ability to select the positive intent out of what others say no matter how their form of expression comes across. By using these skills collaborative leaders can intentionally use focused discussions and conversations to move their goals forward.

The Theory of Negotiated Order is all about bringing stakeholders together in order to socially construct new

organizational forms. Through a fair process of negotiation, collaborative leaders find a win-win alternative where all contributions that are valuable to the relationship are taken into account, so as to enlarge their opportunities. (Ang'ana & Chiroma, 2021) (See "Collaborative Leadership: Starts with Each Individual Participant" visual.)

A recent (2022) Social Science article proclaims that it's important to reward individuals for increasing their efforts towards the success of the whole team. (Ton, et al, 2022) Doing this demonstrates systems thinking in action. This is very important when the cross-functional team has the purpose of transforming the entire organization so that a new innovation can be implemented. It's also important to have leaders to lead team discussions so that any problems in the team are detected early and mitigated. Then, if necessary, leaders must address and remove disruptive factors so that the team's big picture goals can be pursued and so that the systems approach is successful.

Dajci et al (2021) determined that innovation should be a deliberate process if companies are to be globally competitive and successful. They recommend that multinational organizations in particular should select the top performing employees with abilities that include technical communication skills, diversity and inclusion and creativity to serve on their most important cross-functional teams. They also believe that all of upper management should be involved in the innovation process. All of these recommendations demonstrate adherence to a systems thinking approach to innovation.

Grote et al (2012) conducted research that included 110 multi-divisional firms. They found that the extent of collaboration in the early stages of innovation strongly determines the impact of cross-divisional products on corporate success. This means that those divisions that took a systems approach at the very beginning were much more likely to contribute to profits. The study incorporated the concepts of "integration" and "rewards" which take into account the system as a whole. They found that corporate management needs to include cross-divisional goals in divisional objectives. This means that if divisional performance is assessed via revenue growth, an additional revenue growth target with cross-divisional innovation should be included in performance evaluations.

Abma (2022) points out that the integration of all functions into all new product development phases is not the most effective way to design the new product development process. New product (from new innovation) success is more likely when a firm uses function-specific and phase-specific patterns of cross-functional teams, than it is when firms attempt to integrate all functions during all new product development phases. This is what I have thought for a long time. This kind of thinking is at the heart of systems thinking concepts, because it both takes the overall picture into account and has very specific elements that fit into the overall process.

Abma (2022) also states that many scholars have distinguished between phases (of innovation) that require more functions and phases that require less. There are some phases that need a lot of creativity and diversity of thought, and there are other stages that require expert knowledge and so should not involve other functions. In addition, they distinguish between early and late phases of the new product development project, and they say that the amount of functions needed for each of these is very different. Consideration of different phases of innovation and the timing of these phases is consistent with taking a systems approach for implementing innovation.

Dingsoyr et al (2022) found that a "shared mental model" is useful for teamwork. Those working in a particular team need to have a common understanding of their mission and goals. Cross-functional innovation teams have a high level of responsibility regarding the future of the organization and so they can especially benefit from having a shared mental model, plus mutual trust and good communication. Creating a shared mental model shows an ability to consider the system as a whole and as such takes advantage of systems thinking.

Cross-functional team leaders are vital to cross-functional team success especially when it comes to innovation. Such leaders champion the team's activities, coach team members, promote interactions of team members and in general take on the role of social architect. (Sarin & O'Connor, 2009) They are true systems thinkers. They are able to facilitate conflict resolution, collaboration, and help the team to engage in real communication. Sarin & O'Connor (2009) did a study involving 246 participants from 64 new product development teams. They found that the Participative Management Style and initiation of goal structure by the team leader have a strong influence on internal team dynamics. Both of these leadership characteristics had a positive effect on conflict resolution, collaboration and communication quality within the new product development team.

O'Reilly & Binnis (2020) discuss innovation successes of IBM and Amazon. They claim that there are three key steps: ideation, incubation and scaling. I think this is too simplistic of a model and it also has a few shortcomings. Mainly, it doesn't

really address disruptive innovation, which is what I think is the most transformative type of innovation. Amazon's innovations usually start as incremental improvements. This approach won't work for disruptive, radical innovation. At IBM they have disciplined mechanisms for cross-company alignment and monitoring growth in a project. If milestones are not met, the initiative is stopped. In radical innovation situations, this could be a big mistake. Often such situations are ambiguous and may require a champion to promote innovation efforts over a very long period of time before it can start to come to fruition. Yet this can make the difference in whether a technology based company continues to exist or dies.

These researchers did take into account the big picture, which means that they did incorporate some systems thinking into their model. On the other hand, they missed the mark when it comes to outlining a model that includes proper integration of functions as the innovation proceeds as well as proper interactions to get this to happen. This means that they failed when it comes to these aspects of systems thinking.

They did, however, make some useful points. They claim that senior leadership is needed in order to get new innovation going. Not only that, senior leadership needs to be able to view the exploitation of technology as separate from the exploration of technology. They need to be ambidextrous in their leadership capabilities and be able to balance the competing demands of the two. Although this seems paradoxical, it is essential if new technology is to ever be actually implemented in a large organization. Embryonic efforts for innovation have to be protected by upper management in order to prevent them from being stuck to the same performance standards as mature businesses.

Anderson & King (1993) took a systems thinking approach to innovation that includes both innovation phases and leadership styles. This is interesting because it means that they acknowledge that different phases call for different leadership styles. However, their overall approach views innovation as more of a static rather than dynamic type of activity. Essentially, there's not enough detail in their model. Baregheh et al (2009) created a diagrammatic definition of innovation which takes a systems approach (it includes the whole process) and points out many aspects, including stakeholders and methods, that should be considered in order to produce a new innovation. It does not describe the behaviors, qualities and leadership approaches that are needed at each phase of innovation.

A study from the World Academy of Science, Engineering & Technology found that 79.2% of innovation effectiveness is due to the "Quality of Leadership". It took a Systems Approach to Innovation and found that the leaders of the innovation had 5 qualities that set them apart from other leaders. These 5 qualities fall within the categories outlined above in The Three Needs Theory, The Clear Leadership Model and the Theory of Negotiated Order.

First quality is "They have a large radius of trust." Digging deeper into this, it turns out that these leaders are able to surround themselves with people who have propensities that they do not have, to fill out the other categories of the three needs theory: power, affiliation and achievement. They encourage diversity of thought and they have the ability to work with respect towards everyone. They make people at all levels feel important and excited to participate.

The next three qualities are: "They are restlessly curious with a low need for acceptance", "They maintain a truthful sense of self and are keenly aware of how others experience them" and "They engage with their followers through multiple senses." The importance of language to understanding is emphasized in this last criteria. Bridging the gap between different forms of expression is vital to reaching agreements. Genuine communication requires engaging multiple senses. This seems very similar to what is being said in the Clear Leadership Model where multiple modalities are also important.

Finally, the last quality is "They regard knowledge as the yin and creativity as the yang-- one incomplete without the other." The important thing to note here is that this is about working across functions. Similarly, the Theory of Negotiated Order is also about working across functions in order to achieve agreement that incorporates the wishes of stakeholders and results in the best for all concerned.

It's interesting that these qualities fit as well as they do with the 3 theories that were found to be the most useful for collaborative leadership. This study also found that when these particular behaviors and characteristics are present in leaders, their organizations outperform their competitors' innovation efforts by a margin of 29.3%. This was a 5 year study with 240 participants from dissimilar companies including technology, energy and construction industries, which means it has some credibility regarding what works for innovation. (Lakhani, et al, 2014)

C. Team Behaviors
1. Team Mission Analysis
2. Goal Specification
3. Planning
4. Coordination
5. Cooperation
6. Information Exchange
7. Performance Monitoring
8. Systems Monitoring
9. Backing Up Behaviors
10. Intrateam Coaching
11. Collaborative Problem Solving
12. Team Practice Improvement

Sondre Kristensen (2019) did some research and identified 12 team behaviors. Team Mission Analysis is about team members discussing and evaluating potential new product ideas with each other. Goal Specification is about identifying specific goals and dividing them up into achievable sub-goals. Planning involves discussing the strategy for achieving the goals. It also involves evaluating task solutions and team member contributions. Coordination is about team members putting the work of others before their own task work, and collaborating regarding scheduling. Cooperation is about team members working together to complete each task. It also includes working together to improve the quality of each other's work.

Information Exchange is about each team member contributing all relevant information to the discussion as well as sharing any new information that they become privy to. Performance Monitoring is about team members making note of accomplishments and progress on individual tasks. Systems Monitoring is about team members evaluating solutions to determine whether they are sufficient for the longevity of the product. Team members evaluate each other's needs as to what is required for the system implementation to work. Backing Up Behaviors are about a team member helping another team member to make progress in their work. Intrateam Coaching is about a team member working with another team member to get the team member to abide by the team conventions. Collaborative Problem Solving is about team members finding the root cause of a problem together, discussing multiple solutions to a problem, and then implementing a solution together. Team Practice Improvement is about the team evaluating task tracking and improving teamwork, if possible. (See "Team Behaviors" visual.)
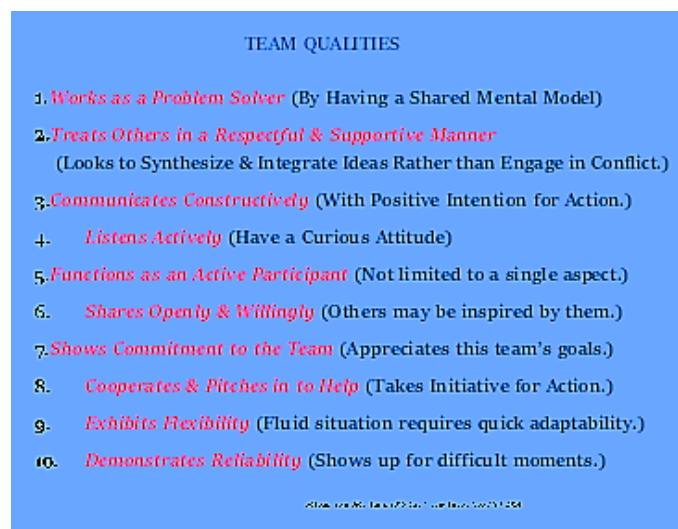

Figure 7: Team Qualities

John Maxwell has a list of 17 team qualities that he thinks a team member should have. This paper discusses 10 team qualities which are similar, but a bit consolidated. Team members who have more of each of these qualities are better equipped for cross-functional teamwork.

Marty Brounstein (2015) identified these ten qualities. The first quality is Works as a Problem Solver. The reason the person is so effective at problem solving is because of having a real understanding about where others on the team are coming from and being able to identify a "shared mental model" so that everyone is able to work towards the same goals.

The second quality is Treats Others in a Respectful & Supportive Manner. This means that a team member will work to synthesize and integrate the ideas of others rather than debate against them and escalate conflict and derision. The goal of each individual is to use the input of others to further the team's goals.

The third quality is Communicates Constructively. This means that the intent behind the communication is to move forward, taking action that will contribute to the team's goals and support the accomplishment of those goals.

The fourth quality is Listens Actively. This means listening with an open mind, not rushing to judgment about what is being said. It means having an attitude of curiosity-- for the purpose of understanding the true meaning of what is being said.

The fifth quality is Functions as an Active Participant. This means that a team member is willing to help beyond their required function. It means there is concern for the overall result and a willingness to contribute in every way possible.

The sixth quality is Shares openly and willingly. Each team member communicates with the others both formally and informally. They share important news and information and sometimes even motivate others to dig deeper in order to overcome obstacles and accomplish the goals of the team.

The seventh quality is Shows Commitment to the Team. Each team member recognizes their special role in the big picture, taking a systems approach to their work and primarily focusing on the goals of their cross-functional team. They care about their work, the team and the team' work.

The eighth quality is cooperates and Pitches in to Help. This is about showing a propensity for action and enthusiasm for getting the work done by working together. This is about taking the initiative to get things done and about quickly responding to requests for help.

The ninth quality is Exhibits Flexibility. It's important to be flexible and adaptable as circumstances change along the way. This means being able to abandon a certain point of view that may no longer make sense in the newer situation. Team players keep their eyes on the goals and quickly adapt when a change of direction is required.

The tenth quality is Demonstrates Reliability. This means that team members are committed to their work even when it's difficult to stay the course. Sometimes there are tense moments of disagreement and when this happens those who demonstrate reliability make they available and work to resolve conflicts for the benefit of all concerned. They deliver high quality performance all of the time, not just sometimes. (See "Team Qualities" visual.)

Next it's important to consider the perspectives, attitudes and intentions behind team qualities. (See Visual) Perspective-taking means putting yourself in the shoes of another person to view the situation. A recent study involving 344 participants involved in collaborative problem solving, showed that when participants interacted in groups with a positive mood, who had a leader to guide them toward a unified perspective, had performance levels that exceeded that of groups with several perspectives. (Hayashi, 2018)

During this same study they did an experiment in which participants were guided by positive impressions toward their partners. When this was the case, they felt motivated to discuss perspectives that were different from their own.
The positive condition and positive mood caused them to want to examine the leader's perspective. When they were able to examine its validity, they were able to see that the leader's perspective had merit. This then led to them being able to integrate different perspectives that were relevant, so that they had a robust approach that was workable.

This is important, because too much conflict causes an unworkable situation to happen. With positive conditions and a positive mood, a leader is able to present different perspectives to the team with only a minimum amount of conflict. This results in enabling group members to focus on the different perspective more efficiently and it also facilitates the convergent process. The convergent process is necessary in order for the team to arrive at an agreement about how to proceed with the work. (Hayashi, 2018)

A very interesting study in 2020 compared the "mind-wandering mindset" (that is a laissez faire approach) with a

"perspective-taking mindset" (using suggestions about how people in different roles might use certain objects, priming their thinking process). The Perspective-Taking Mindset yielded more ideas and more original ideas than the Mind-Wandering Mindset. This was a simple experiment using a broom, flashlight, chair, umbrella, shoe and smartphone as the objects of stimulus. Yet the results are very useful to know when it comes to teamwork for innovation. (Chou & Tversky, 2020).

Figure 8: Perspective-Taking, Attitudes & Intensions: Behind Team Qualities

The study clearly shows that using "intention" in team processes, is much more effective than more chaotic methods. At its core, the Perspective-Taking Mindset involves adopting relevant perspectives/ different perspectives. Humans have the ability to adopt a particular perspective, then deliberately switch to another perspective. This kind of directed thinking was shown to produce more creative results than a more open ended approach. Intention is the driving force when it comes to collaboration and teamwork. A study was done with 173 senior project members from different organizations. It showed that congruence between performance (quantity of work) and mastery (quality of work) motivational climates is significantly related to the best collaboration behavior in teams. Essentially, they found that motivation, based on specific goals, can uplift team members and get them to work together to produce the best results.

This is good news for organizations, because it means that they can stimulate collaboration in teams by actively supporting a motivational climate that encourages teamwork towards specific goals. Leaders can help shape an employee's perception about what is valued and expected for cross-functional teamwork. When leaders are able to motivate teams so that team members contribute to the well-being of others on the team, this then is likely to lead to effective cooperation and smooth interactions. There are several approaches that can be used to achieve this. The leader can lead by example, or can acknowledge members who exhibit this behavior, or bring them into the team. In any case, the point is to include in the evaluation how well team members are able to build interpersonal ties with their comrades. (Caniels, et al 2019)

Individual attitudes of team members can make a whole lot of difference regarding whether that team succeeds or fails. In 2020 a study was done that included 288 team members working at 41 different high-tech firms in Jordan. It showed that some conflict is "required" in order for teams to be viable and innovative. Results suggested that team leaders must create a sense of openness for collaborative interaction so that team members will be motivated to explore their own opinions and positions. They need to use reflexivity or introspection in order to examine their own judgments, assumptions, beliefs and biases. Such self-examination leads teams to explore ways to turn conflicting opinions into feasible solutions.

The area of concern here in this paper has to do with actions within large organizations. However, we can learn from entrepreneurial studies because the participants have similar drivers. One study in 2023 that included 320 participants found that entrepreneurial attitude is a key predictor of entrepreneurial intention. The study found that Entrepreneurial Attitude was the only quantitative independent variable that had a significant impact on Entrepreneurial Intention. (Warraich, et al, 2023).

Another study from 2023 was designed a bit differently. Instead of having Entrepreneurial Intention as a dependent variable, and Entrepreneurial Attitude as an independent variable, it postulates that a higher degree of entrepreneurial behavior results from a balance between high levels of Entrepreneurial Attitude and Entrepreneurial Intention. This study had a dataset that included 1,890 participants. This study affirms the importance of Attitude and Intention separately in generating Behavior-- both are crucial. The authors state that individual's favorable appraisals, desires and intentions should be nurtured and developed with supportive policies and strategies. They say that national policies and strategies should be devoted to enhancing the ecosystem and reducing the barriers for novel enterprises (and I am assuming innovative efforts within enterprises). It is crucial to foster and support these entrepreneurial behaviors. (Duong & Vu, 2023)
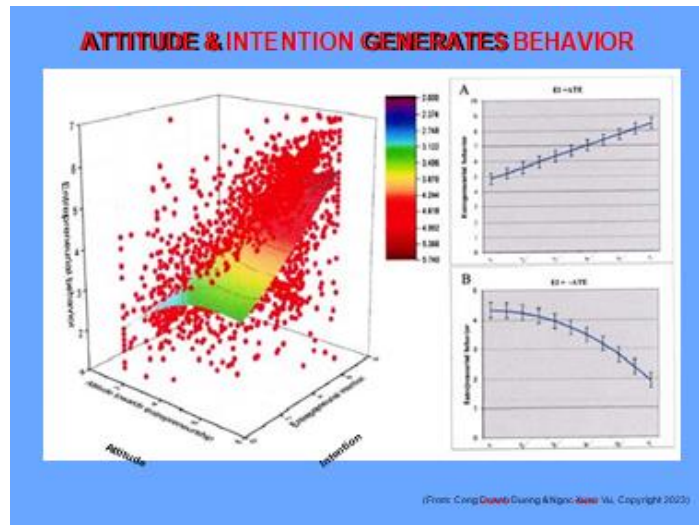

Figure 9: Attitude & Intention Generates Behavior

Duong & Vu have revealed amazing results in their study. Their exhibit clearly shows increased Entrepreneurial Behavior when Attitude and Intention are high. A recent study looked at paradoxical leadership and team perspective taking. Paradoxical leadership involves competing, yet interrelated activities. The central idea of paradoxical leadership is that the leader adopts a "both-and" approach that integrates competing demands to harness the intention within the paradox. This "both-and" approach shifts over time to promote team information integration. This leader will also offer necessary instructions and guidance to achieve innovative goals. Such a leader influences the team's perspective and shapes it so that it is actionable.

This study involved analyses of multi-time and multi-source data from 98 teams and it suggests that teams with expertise diversity exhibit better innovative performance when paradoxical leadership is applied. It also shows that team perspective taking helps teams comprehensively embrace and evaluate various ideas, so that they can be integrated (See Perspective Taking/ Integrating Perspectives Visual). Leaders benefit when they consider others' perspectives, reframe their perceptions and reinterpret events so that integration is possible. Paradoxical leaders have attitudes and intentions that positively influence team perspective taking (Li et al, 2018).

An old study from 1997 on New Product Development involved 300 Mexican high tech firms. It showed that individuals in R&D, Marketing and Manufacturing all believed that internal facilitators were the drivers of cross-functional cooperation. They also believed that what made the difference in their performance was the firm's evaluation criteria, reward structures and management expectations. Overall, the quality of their cross-functional communication was the most critical success factor. In conclusion, the study highlights the necessity to include perceptions from all relevant functions in order to achieve the desired level of cross-functional cooperation. Furthermore, it states that top management must actively champion the project and provide strategic direction as well as foster a culture that supports cross-functional cooperation. The two roles of championing the project and creating cross-functional cooperation may collide at times, so management must use diplomacy to get cooperation from different functional areas (Song, et al, 1997). Although it is even truer now, in 1997 there was some recognition of the need for dual goals for an organization: operational as well as strategic. Innovation and eventually the new product that results from it, requires the organization to support both positions. This is a challenging and yet essential requirement for the longevity of the organization.

Figure 10: Leadership Tool for Many Approaches

As a starting point, it is good to recognize that innovation and new product development requires extra attention and extra steps by the organization. It does not happen accidentally. It requires management that does take on the essence of a paradox at times. The team qualities mentioned earlier: Problem Solver, Respectful, Constructive, Curious Listening, Active, Open Sharing, Commitment, Cooperates, Flexibility and Reliability are all energized with a positive spirit by the attitudes and intentions behind them. While it may be possible to "appear" to demonstrate these qualities to some extent, what really matters is the true attitudes and intentions with which they are demonstrated.

Most of these, if not all of these qualities, show up in the above research studies along with explanations about the powerful impact of attitudes and intentions on the results. In addition to behaviors and qualities of team members, there are various leadership approaches that can be used in cross-functional teamwork. Using the right leadership approach at the right time, can make all the difference in whether or not an innovation effort is successful. Next, various options for leadership approach (or style) will be described (See Leadership in Cross-functional Teams Visual).

Figure 11: Leadership in Cross-Functional Teams

Intellectual Stimulation is all about a leader probing innovators with questions and sparking their curiosity so as to stimulate them to pursue avenues that they had not considered before. (Some may consider intellectual stimulation to be a component of transactional leadership, but I think it goes beyond typical operational motivation and is a type of leadership that can move innovation forward) (Kesting, et al, 2015). Individualized Consideration is about a leader tailoring his or her approach

to an individual team member to motivate that person to higher levels of achievement. People are different, so this approach can be very effective when it comes to motivating talented people drive them even harder to achieve team goals. (This approach has been included by some researchers as a component of transactional leadership. Typically, those who lead that way are not concerned much about the individual, so I think it has merit as its own leadership approach.) (Kesting, et al, 2015)

Charismatic Leadership is about an individual using their behavior, beliefs and personal example to inspire and motivate others to take action. They are often visionaries with contagious enthusiasm (Kesting, et al, 2015). Directive Leadership happens because of a leader's positional power and it's about structuring subordinate's work with clear directions and expectations about their behavior. Subordinates are "directed" to accomplish certain tasks. (Lornikova et al, 2013).

Participative Leadership is about team members having a shared influence in decision making, even though the leader actually makes the choice (Somech, 2006). Interactive Leadership originated from Rosener (1990) who identified four characteristics of interactive leadership: encouragement for participation, widespread sharing of information and power, efforts to exchange self-worth of employees, and energizing employees for different work tasks.

Transformational Leadership is an advanced form of charismatic leadership which exists for the purpose of transforming organizations. (Smith, et al, 2004) Some say by inspiring creativity and others say by being able to contribute essential resources. (Kesting, et al 2015) In any case, it's about inducing change and having an impact on the implementation of major change within an organization.

Transactional Leadership is not focused on change. It is about individuals completing work tasks and receiving the proper rewards for this work, as if it was a transaction. (Kesting, et al, 2015) This type of leadership is particularly suited to implementation, not coming up with new ideas or creating anything.

Strategic Leadership is about advancing new ideas from the conceptualization phase to the developmental and commercialization phase. (Sternberg, et al, 2004; Wong, 2013) Strategic leaders often have a strong vision and a commitment to that vision. They take risks, yet are able to proceed strategically with sensitivity to what's happening in the environment, remain flexible, and work closely with others in order to implement that vision. They draw out and facilitate innovative capabilities in others.

Shared Leadership has team members who lead one another toward the achievement of their collective goals. They participate in a process that is dynamic and interactive whereas the process unfolds they mutually influence each other and it is that mutual influence that leads the team forward. (Pearce, et al, 2009)

Distributed Leadership has multiple leaders within the group. (Mehra, et al, 2006) A distributed leader has strong communication skill and expertise in managing autonomous teams. Distributed leadership can be time consuming and difficult due to having so many "leaders" who are not necessarily aligned towards a common vision.

Power Transitions (Heterarchy) is based on Systems Thinking because the focus of "whoever is in power at the moment" is on achieving the goals of the team. This form of leadership relies on the transfer of power to the most capable individual on the team for a particular task or goal. It operates in a very dynamic and fluid manner.

Aime et al (2014) conducted a study that utilized 516 directional dyads in 45 teams. They found heterarchical structures in which the expression of power actively shifts among team members so that team member capabilities are aligned with dynamic situational demands that can enhance team creativity. In cross-functional teams, power relationships shift over time according to their relevance to the task. Formal authority, expertise and access to information are important resources that different individuals possess and so by shifting power during teamwork, these resources can come into play at the right time for the maximum benefit of the team. (See "Leadership in Cross-Functional Teams" visual.)

Cross-functional teams that take a Systems Approach are much more likely to succeed at creating new innovation. Taking a Systems Approach involves considering the big picture-- which takes into account the organization's overall goals. The cross-functional team keeps this context in mind as they proceed with their work. The team functions well when each team member employs certain behaviors, qualities and leadership approaches.

During an innovation implementation project, there are often numerous cross-functional teams operating at many levels of the organization. Fortunately, as time goes on, when things are going well, each team develops into a higher functioning team

and the project proceeds so that more and more pieces of it are put into place. In addition, the various teams at various levels start to collaborate more and move the project forward. This is what happens as the process proceeds. (See "Collaborative Leadership" visual.)
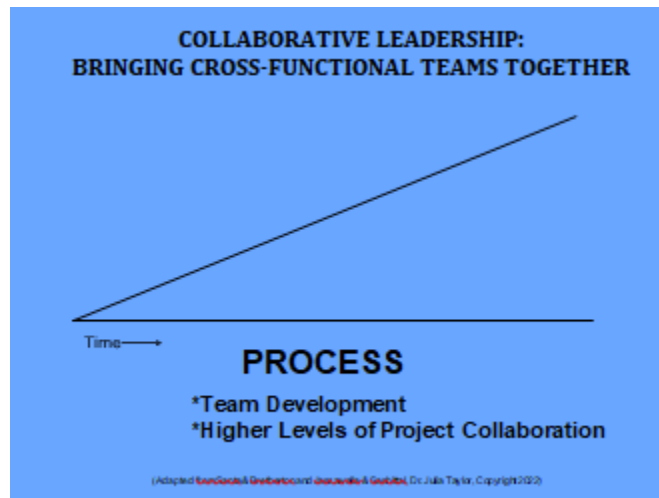

Figure 12: Bringing Cross-Functional Teams Together

Jassawalla and Sashittal (1999) point out that teams become more collaborative as they work on a project and the organization starts the process of transformation as this work proceeds. First there is information sharing among functional groups, then improved cooperation in implementing new product decisions, then joint planning and early involvement of the production and marketing groups, then the coordination of activities is further refined, more departments begin to invest more as they become more committed, departments become more transparent to each other regarding the new product, various departments become more mindful of how their actions affect other departments, and finally departments start to get together to capitalize on synergies that are now possible due to their collaboration.

There are many types of Cross-Functional Teams involved in implementing a new technology innovation. Cross-functional Teams vary as to which behaviors, qualities and leadership style is the most relevant for each phase of innovation. This is an important consideration when it comes to creating innovation and actually implementing it.
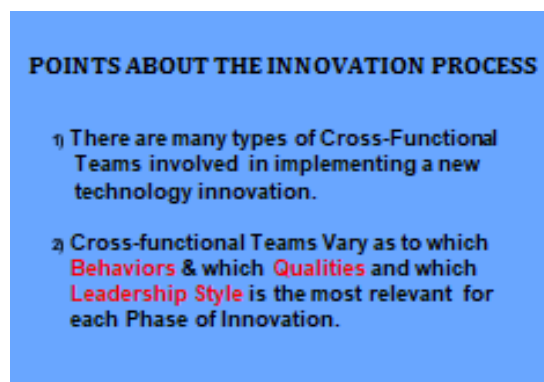

Figure 13: Points about the Innovation Process

Kesting et al (2015) found that much more research is needed on the link between different leadership styles and different innovation stages, types and elements. Existing findings do not form a coherent picture. Often research is framed in too much of a general or global manner that does not have enough specificity. There are differences in the requirements for different phases of innovation, and different organizational requirements that must be met in order for a new innovation to be implemented. This is a challenge because in order for a model to be useful, it can't have too much detail, yet it needs to have enough detail to be credible. The Systems Approach offers some help with this issue because it includes a number of different perspectives. It is also important to note that upper management must be able to be ambidextrous and be able to approach innovation from a

paradoxical perspective. This means that they have to be able to view the organization from a strategic point of view and an operational point of view, each of which has very different requirements. Then being able to juggle those and weave them together certainly requires special talents (See "Points about the Innovation Process" visual.) Bringing it all together means looking at what behaviors, qualities and leadership styles work best for each specific stage or phase of innovation. See the visual for a proposed model showing the various phases.
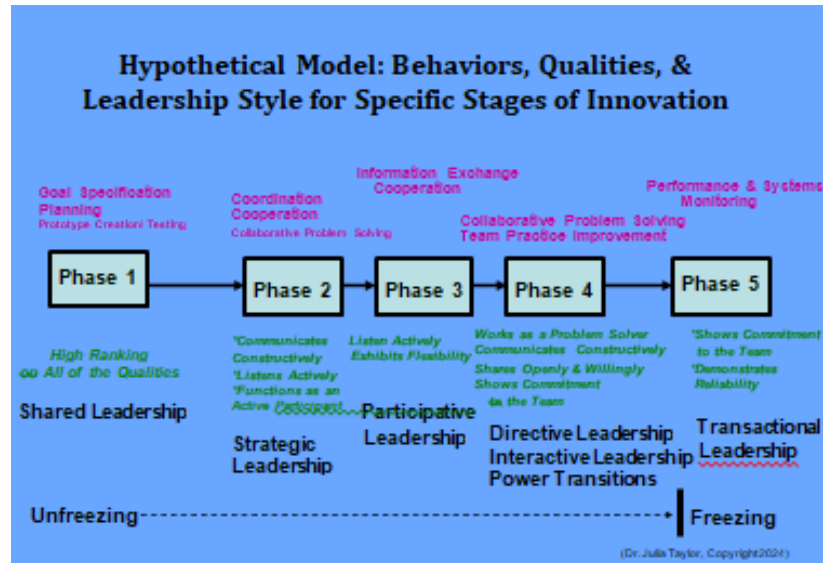

Figure 14: Hypothetical Model

This could be a breakthrough for some organizations, because innovation isn't easy to actually implement. A McKinsey study found that 70% of Senior Executives considered innovation to be a major concern. (Barsh, et al, 2008) Regardless of this, there is a high level of failure when it comes to innovation, so there is a clearly a need for more information about what makes it work. A model that incorporates the pertinent factors and provides some guidance would be very useful. Next I will describe a theoretical qualitative model, based on secondary research and my insights on the innovation process. This model proposes that there are different behaviors, qualities and leadership styles that work best for each stage of innovation. By being aware of these, organizations will be able to better select cross-functional team members, educate them, monitor their performance, and create an environment where they can thrive.

Key to this model is the notion that only select people will be involved in an innovation effort. As the project proceeds more people will be included, but only those that are essential to the effort. As this starts, to take place there will be an "unfreezing" (Burnes & Bargel, 2017) or "decomposition"(Dinca & Mitu, 2021) process that begins. This means that there is a loosening of adherence to the day to day operating rules that are well established in the company. At first this is more of a process of "making exceptions to the rules", but once a clear decision has been made to pursue the new technology, this will become more of a change management process. Eventually, there will be changes that affect each department in relation to the new technology and the new product being produced. After those changes have been instigated, the company then goes back to having more routine day to day operating systems. This is the "Freezing" or "Refreezing" process.

Since this is only a model, the criteria and the phases can vary depending on what the situation calls for. For this illustration, I have elected to have five phases in the new innovation process. Then I selected certain behaviors, qualities and leadership styles to go with each of the five phases. These are my guess about what could work in a hypothetical situation. In Phase 1, Key Behaviors include identifying the team mission, specifying specific goals, beginning planning and building and testing a prototype. All of the team qualities contribute to success in this phase, so it's better to rate high on them. The leadership style that works best here is shared leadership where the team operates as an autonomous, self-directed team.

In Phase 2, Key Behaviors include planning, coordination, cooperation and collaborative problem solving. For this phase the qualities of communicating constructively, listening actively, and being an active participant are vital to success. Strategic leadership will allow this phase to be effective.

For Phase 3, Key Behaviors that are needed are exchanging information and cooperation. In this phase, qualities most needed are the ability to listen actively and show flexibility. Participative Leadership is most likely to move this phase forward because many different functions need to feel included.

In Phase 4, Marketing and Manufacturing must start to seriously cooperate with Engineering and New Product Development. Key Behaviors include collaborative problem solving and team practice improvement. The qualities that most contribute to the success of this phase are "Works as a Problem Solver", "Communicates Constructively", "Shares Openly and Willingly", and "Shows Commitment to the Team". Leadership styles that are useful for this phase are directive leadership, interactive leadership and the use of power transitions in order to make the most of the cross-functional teamwork.

In Phase 5, The Key Behavior is performance and systems monitoring. The qualities that are the most useful are "Shows Commitment to the Team", and "Demonstrates Reliability" because working out bugs and kinks in various processes can be challenging. The leadership style that is employed in this phase is transactional leadership, because this is the phase where there is a return to operational consistency. Next I am going to provide an example of using Systems Thinking in Cross-functional teams to create innovation (See Visual about the Intel P6 Microprocessor.)
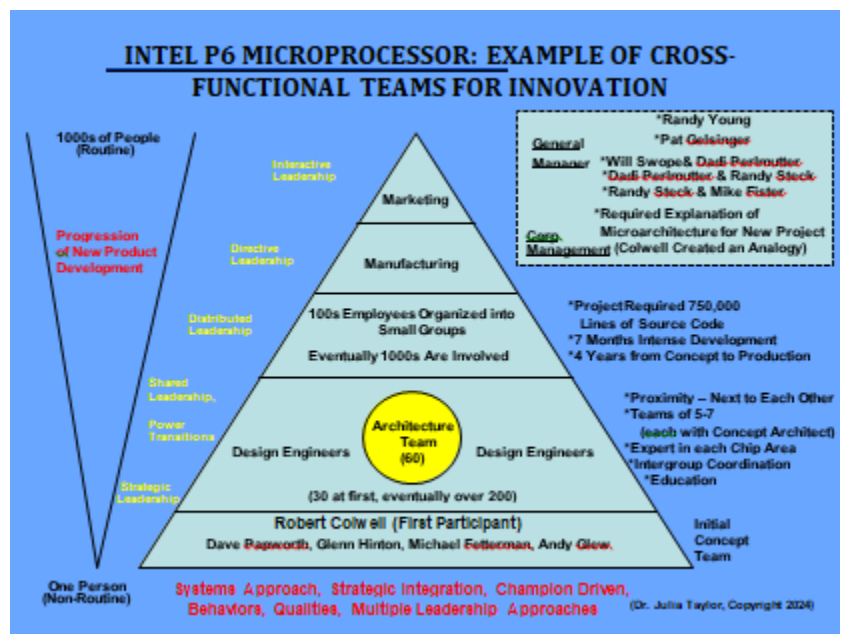

Figure 15: Intel P6 Microprocessor

This example incorporates some of the behaviors, qualities and leadership approaches mentioned above that can be included in a model similar to the hypothetical model I just described. This example is about when Intel created the P6 microprocessor, which was a landmark innovation for the microprocessor industry as well as a big success for Intel. The microarchitecture that it was based on was the first of its kind. The P6 became the most successful general purpose processor ever created. Hundreds of millions of P6 chips were sold. It served as the basic design for a sequence of different chips that Intel produced going forward.

It was not what upper management had intended initially. They simply wanted Colwell to come up with a faster chip, an incremental improvement. He took on the challenge under that perception. As a result he was left alone and had some space in which to pursue the project. He had something else in mind-- a revolutionary chip. It turned out that he was able to win upper management over when the time came for Intel to make the go/ no go decision about producing the chip.

This example is a bit unusual because its success was driven by Robert Colwell, who was rather far down in the ranks. He was the Champion who made it happen over a period that lasted over 4 years. He had a connection with upper management from the very beginning and he managed the relationship very carefully over that entire period. Essentially, he answered to five different sets of individuals who served in the general manager role above him. None of them rallied against him and his project,

so he simply pressed on with it. His project happened more because of their lack of interference, than due to their support. It was a true leap forward in microprocessor functionality because it was based on several new technologies that had not been successfully implemented in a new product innovation before. He made an analogy to how it would work with a supermarket shopping trip. Instead of using one shopping cart and having to get everything on your list sequentially, with his new chip a shopper would have the capacity of using the equivalent of three shopping carts and gathering up items in any order. It was a lot faster, more efficient and easier-- all around it was an order of magnitude better.

The reason that this was such a success is because first of all, he used Systems Thinking from the initial idea-- which was directly in alignment with Intel's corporate strategy, to the way the teams were set up, to the way the teams worked together, to the way the teams incorporated the manufacturing and the marketing departments at crucial points in the process and using the right degree of involvement at these points, to the way they debugged the chip problems and overcame those implementation obstacles, to the way they optimized production at the end. Systems thinking were incorporated into the way that cross-functional teams worked together (See Intel P6 Example Visual).

The essence of how the cross-functional teams worked together was by taking advantage of perspective taking and having very positive attitudes and intentions. Robert Colwell had a lot to do with the design of the project itself. His ideas about how to make it work were crucial to its ultimate success. He found a way to accomplish a lot more than could be done with Intel's typical process for creating a new chip. The Intel P6 Example Visual provides an overview of the key players and how the process unfolded over time. It's not a perfect visual, in that Manufacturing and Marketing were involved at least peripherally very early on and this looks like they got involved later. What happened was that they got a lot more involved as the process got further down the line. Plus Upper Management also was at least peripherally involved even before the project got started with Robert Colwell, and they were included at key points when decisions had to be made regarding resources and personnel.

Robert Colwell was sent to Oregon and assigned by his boss, Randy Young, to work on creating a faster chip. They wanted one that was twice as fast as what they had available. Very quickly he was able to recruit some key people to his initial team: Dave Papworth, Glen Hinton, Michael Fetterman and Andy Glew. Each one brought special, vitally important skills to the table. They started working on creating the architecture. They did it by testing certain ideas out with prototypes and simulations. At first they had a hard time getting anywhere because they couldn't keep track of where they had gotten to. They tried flipping between each other's desks and using whatever conference rooms were available, then they stumbled onto a storage closet where no one could find them and interrupt their work (the context mattered). Then they started making progress coming up with the initial concept. This was kind of the equivalent of working in a "skunk works", which is a well-known method of providing innovators a safe haven for working apart from the day-to-day operations of the company.

Although they did add features and make changes as they went along, the basic architecture was created by this small team that worked in the storage closet for six months from November 1990 through March 1991. In the early days it became clear that the path to success on this project was teamwork. One senior architect wasn't good at teamwork, and fortunately he dropped out, so they didn't have to deal with him anymore. They dodged the bullet on a few other fiascos that threatened their "teamwork". It would certainly be better if upper management understood more about the power of cross-functional teamwork for innovation. This was an ambitious project and the 5 key people that worked on it in the beginning did it because they wanted to and they were very dedicated to having it is a success.

The next major step meant bringing in a lot more people into the project. Having learned about the importance of context during their initial work, Colwell set up the work setting so that architects and designers would be in close physical proximity to each other. That way whenever an issue came up, it could be dealt with right away and would not haunt them down the road. It was a little bit funny because the layout of the chip itself and the layout of their working space were similar.

Unlike what happened in many previous projects, the architects were involved from start to finish. They did not create the overview and then throw it over the wall to the designers. They got constant feedback from the designers, made many modifications to their work, and it happened because the designers and the architects were able to adopt each other's perspectives and resolve issues as a result. Colwell placed the architects, 60 at this phase, right in the center of the room. Then the designers were placed around them. As progress was made, more and more designers had to be brought in to work on the project. A big part of what they had to do to make this work was to educate those being brought in about what they were doing. They took the time to do this and it paved the way for their future work and made it much easier than it would have been otherwise. Here is one point where it's evident that their attitudes and intentions played a role in getting the results that they got.

Eventually, in the next step, Upper Management, made the go/ no go decision and decided to produce the chip as an Intel product. It was at this point that many more people had to be brought in, in order to write the tremendous amount of code required for the chip as well as attend to many other key aspects that had to be precisely worked out and put into the chip. This meant that 100s of people, divided into small groups, were brought in, and eventually there were even 1000s of new people that were brought into the project. This is the stage of completing the core work for the project. It also involves a lot of debugging and overcoming obstacles between different functions, so that the whole chip works together as it's supposed to.

Colwell talks about how important it is to find the right incentives to keep a large design team engaged for years in order to achieve project success. One big incentive is career advancement: promotions, pay raises, and stock options, for instance. Showing recognition in front of peers also carries a lot of weight. People want to impress their peers. Colwell's goal was to create a world-class product. This requires, he says: "full commitment at every level and at all hours". He wants to know that the design team ponders the problems during the time they are off, and this indicates that the team is fully engaged and giving 100% to the job. Management policy did help in the sense that its MBO, Management by Objective, list of intentions served as a device for preventing miscommunication among cooperating design groups.

Colwell makes the assertion that "our engineers wanted to succeed". This is what sustained them over so much time and kept them going in spite of the dangers of "burnout". They had extreme dedication because of their commitment to the project and their internal desire to have it be a success. Their attitude was that they were going to succeed and their intention was that nothing was going to get in the way of that. They had a high level of entrepreneurial resilience and willingness to try new things.

Marketing was brought in quite early, so that they could start helping adjust the product to fit what the customers wanted, and especially in this case to adjust the product so that it would be versatile enough to work with a lot of different customer demands. Manufacturing was included early on in order to make sure that the product they were engineering could be mass produced. Then as the design approached the finish line, manufacturing had to help them to make sure they designed in parts that were available and could be incorporated in the most efficient manner.

Team member behaviors (actions) included focusing on the mission, specific goals, planning, coordination, cooperation, information exchange, backing each other up, monitoring the overall process to try to improve it, and working collaboratively on sticky issues. All of these actions sprang from the inner desires of team members to perform at a high level (attitude) and with the intention of finding a way to work together to get the chip to work in the most elegant way possible. By having people on the cross-functional teams who were problem solvers, respectful and supportive of others, flexible and reliable, able to share openly for the good of the team, listen actively and communicate constructively, they were able to set up teams-- to begin with, that were likely to succeed.

Colwell got his original assignment as a result of Strategic Leadership. He used Shared Leadership from the very beginning and he was able to get the team to switch the power (Power Transitions) from one to another so that the individual with the most to contribute at any particular time was the person in the power position. He had to be rather charismatic when he dealt with upper management. Once the project got underway and 100s were brought in, Distributed Leadership played a major role. Then ironing out the discrepancies and getting the teams in alignment at the end, required Directive Leadership. Finally, working with Marketing required Interactive Leadership because their work had to accompany the production of the product, but the Marketing department had the expertise to be able to support that product so that it could be sold in the marketplace.

The P6 development process involved using the systems approach, which had a great advantage because due to using cross-functional teams from the beginning, problems that would show up after the product was produced, now didn't happen at all. Instead they were identified at the product development stage, which insured that the product could be correctly designed the first time. This kind of forethought, planning and systems thinking enabled this chip to get to production much quicker than it usually took at Intel.

IV. CONCLUSION

In conclusion, cross-functional teams are very useful for implementing new innovation in organizations. They are formed specifically for this purpose and operate as a different system than the normal day to day operations of the company. By incorporating high level systems thinking into their work, they are able to transcend the boundaries of the day to day operational system. This is the context that they work in. The process of implementing new innovation involves connections to the main organization that increase as the process evolves. This starts an "unfreezing" process which allows this innovation effort to

proceed as a separate endeavor, superimposed on operations. Higher level cross-functional teams are formed as is required by the particular innovation.

Perceptive-Taking is a deliberate process that allows members on a cross-functional team to "put on" the perspective of each of their colleagues. This is the first step in being able to integrate those perspectives together so that the way forward is clear and the team is united in pursuing the goal. What is behind team qualities and actions are the attitudes and intentions which form the foundation for these. When a team has a positive attitude and a high intention, it is likely that the team will succeed, because these are the factors that fuel the flames of passion for their work.

Cross-functional team leaders are boundary spanners who are able to speak the language both of their function as well as the function of the cross-functional team. They are the movers and shakers who make innovation possible. They have special skills for collaboration which are outlined in 3 theories. These skills include being able to build trust and bring out the best in their colleagues, lead themselves and others with focused discussion toward team goals, and motivate stakeholders to negotiate fairly and actually construct new organizational forms as needed for the new innovation.

Many studies dealt with various aspects that are vital to a creating a model for using systems thinking in cross-functional teamwork to create innovation, yet none of them combined these aspects in a comprehensive manner with enough detail to be useful. I took on this challenge by combining team behaviors, qualities and leadership approaches and relating these factors to the process of innovation. It turns out that if you consider that different behaviors, qualities and leadership approaches work better for the different phases of innovation, you can identify a model that makes sense (at least anecdotally) for the innovation process. Perhaps, the behaviors, qualities and leadership approaches that work best for each phase may vary depending upon the specific situation. I presented a model of a hypothetical situation that I think included the factors that would work best at each phase. This model included some differences as compared with the actual example I presented.

This researcher has run into the same challenges that other researchers have encountered, namely getting enough detail into the model in order for the model to be useful, without overwhelming the user with so much information that it's paralyzing. I have pointed out some of the short comings of other researchers, but I have not fully addressed all of the gaps. Most importantly, what I have proposed might set the stage for future research, but it does not offer quantitative evidence. Finally, I presented an actual example of using systems thinking in cross-functional teamwork to create innovation.

Although this example had some differences as compared with my ideal hypothetical model, it does illustrate the overall concept of this model in action. This example was about how Intel created the P6 microprocessor which was based on a new breakthrough microarchitecture that did not exist before the project. They successfully used many cross-functional teams at many levels of the organization in order to implement new innovation. They did this by paying attention to what was needed at different phases of innovation in terms of behaviors, qualities and leadership, and most importantly doing it with a positive attitude and great intentions.

It is my hope that my model will provide innovators with some guidance about the overall process, help them to think more about how to incorporate systems thinking into their work, cause them to be more mindful about the differences that exist during different phases of innovation, and motivate them to create a road map about how the innovation process will unfold for their particular new innovation and/or new product.

Interest Conflicts
"The author declares that there is no conflict of interest concerning the publishing of this paper."

V. REFERENCES

[1] Ang'ana, Gilbert A. & Jane Adhiambo Chiroma, "Collaborative Leadership and its Influence in Building and Sustaining Successful Cross-Functional Relationships in Organizations in Kenya", IOSR Journal of Business and Management, August 2021, Vol. 23, No. 8, pp. 18-26.

[2] Avolio, Bruce J., & Bernard M. Bass, Doug Jung, "Re-examining the Components of Transformational and Transactional Leadership using the Multifactor Leadership Questionnaire", Journal of Occupational and Organizational Psychology, 1999, Vol. 72, pp. 441-462.

[3] Kowal, Jolanta, Flavio de Sao Pedro Filho, Monika Ziobrowska, & Dariusz Zaremba, "Pro-Innovation Behavioral Profile of the Organization in e-Government Managers' View in Poland", Twenty-ninth Americas Conference on Information Systems (AMCIS), Panama, 2023, AMCIS 2023 Proceedings of Association for Information Systems, https://aisel.aisnet.org/amcis2023/sig_egov/sig_egov/9.

[4] Kristensen, Sondre, Teamwork Behaviors in Autonomous Cross-functional Teams, Thesis-- Masters in Software Engineering, University of Oslo, May 2019.

[5] Usman Ali Warraich, Sara Rashid, Salman Ahmed Khan, & Asad Javaid, "From Mindset to Action: Unpacking the Drivers of Entrepreneurial Intention in University Business Students", Journal of Entrepreneurship, Management, and Innovation, 2023, Vol. 5, No. 2, pp. 168-186.

[6] Duong, Cong Doanh, & Ngoc Xuan Vu, "The Single, Complementary, Balanced, and Imbalanced Influences of Entrepreneurial Attitudes and Intentions on Entrepreneurial Behaviors: Polynomial Regression with Response Surface Analysis", Heliyon, 2023, Vol. 9, e14604, pp. 1-17.

[7] Brounstein, Mary, "Ten Qualities of an Effective Team Player", from Programme 2015, Google.

[8] Maxwell, John C., The 17 Essential Qualities of a Team Player, 2002, Thomas Nelson Publishers, Nashville, Tennessee.

[9] Burnes, Bernard & David Bargal, "Introduction: Kurt Lewin 70 Years On", Journal of Change Management, 2017, Vol. 17, No. 2, pp. 4-8.

[10] Boonstra, Jaap, "Reflections: From Planned Change to Playful Transformations", Journal of Change Management, 2023, Vol. 23, No. 1, pp. 12-31.

[11] Zhang, Wei, Yuan Jiang, Wenkai Zhou, & Wei Pan, "Antecedents of Knowledge-Seeking Intentions and Efforts within New Product Development Teams: Empirical Evidence from Knowledge-Based Chinese Companies", Journal of Knowledge Management, 2022, Vol. 27, No. 2, pp. 356-382.

[12] Hayashi, Yugo, "The Power of a "Maverick" in Collaborative Problem Solving: An Experimental Investigation of Individual Perspective-Taking Within a Group", Cognitive Science, 2018, Vol. 42, Suppl. 1, pp. 69-104.

[13] Yung-Yi Juliet Chou, & Barbara Tversky, "Changing Perspective: Building Creative Mindsets", Cognitive Science, 2020, Vol. 44, pp. 1-28.

[14] Caniels, Marjolein C.J., Francois Chiocchio, & Neeltje P.A.A. van Loon, "Collaboration in Project Teams: The Role of Mastery and Performance Climates", International Journal of Project Management, 2019, Vol. 37, pp. 1-13.

[15] Suifan, Taghrid Saleh, Salah Alhyari & Rateb J. Sweis, "A Moderated Mediation Model of Intragroup Conflict", International Journal of Conflict Management, 2020, Vol. 31, No. 1. pp. 91-114.

[16] Li, Quan, Zhuolin She, Baiyin Yang, "Promoting Innovative Performance in Multidisciplinary Teams: The Roles of Paradoxical Leadership and Team Perspective Taking", Frontiers in Psychology, July 2018, Vol. 9, Article 1083, pp. 1-10.

[17] Song, X. Michael, Mitzi M. Montoya-Weiss, & Jeffrey B. Schmidt, "Antecedents and Consequences of Cross-Functional Cooperation: A Comparison of R&D, Manufacturing, and Marketing Perspectives", Journal of Product Innovation Management, 1997, Vol. 14, pp. 35-47.

[18] Colwell, Robert P., The Pentium Chronicles, 2006, IEEE Computer Society, John Wiley & Sons., Inc., Hoboken, New Jersey.

[19] Jassawalla, Avan R. & Hemant C. Sashittal, "Building Collaborative Cross-functional New Product Teams", The Academy of Management Executive, August 1999, Vol. 13, No. 3, pp. 50 - 63.

[20] Santa, Ricardo & Phil Bretherton, "The Role of Cross-functional Teams on the Alignment between Technology Innovation Effectiveness and Operational Effectiveness", International Journal of Technology Management, 2011, Vol. 55, Nos. 1 & 2, pp.122-137.

[21] Ton, Anh Don, Laszlo Hammerl, Dennis Weber, Oliver Kremer, & Gabor Szabo-Szentgroti, "Why Leaders are Important for Cross-functional Teams: Moderating Role of Supportive Leadership on Knowledge Hiding", Problems and Perspectives in Management, 2022, Vol. 20, No. 3, pp. 178-191.,

[22] Dingsoyr, Torgeir, Diane Strode & Yngve Lindsjorn, "Right Thoughts and Right Action: How to Make Agile Teamwork Effective", Amplify, 2022, Vol. 35, No. 2, pp. 12-17.

[23] Raisinghani, Mahesh S., Anshu Arora, Nick Del Grosso, Anthony Hughes, Tom Jacobson, Tom Lewis, & Maureen Opiyo, "Increasing Quality Output of Cross-Functional Teams: Methods to Measure and Enhance Performance", 2009, pp. 1-17.

[24] Sarin, Shikhar, & Gina Colarelli O' Connor, "First Among Equals: The Effect of Team Leader Characteristics on the Internal Dynamics of Cross-Functional Product Development Teams", Journal of Product Innovation Management, 2009, pp. 1-24.

[25] O'Reilly, Charles & Andrew J. M. Binns, "The Three Stages of Disruptive Innovation: Idea Generation, Incubation, and Scaling", California Management Review, 2019, Vol. 61, No. 3, pp. 49-71.

[26] Baregheh, Anahita, Jennifer Rowley, & Sally Sambrook, "Towards a Multidisciplinary Definition of Innovation", Management Decision, 2009, Vol. 47, No. 8, pp. 1323-1339.

[27] Anderson, Neil, & Nigel King, "Innovation in Organizations", International Review of Industrial and Organizational Psychology, 1993, Vol. 8, pp. 1-34.

[28] Lakhani, Murtuza Ali, & Michelle Marquard, "Mastering the Innovation Paradox: The Five Unexpected Qualities of Innovation Leaders", International Journal of Social, Management, Economics and Business Engineering, 2014, Vol. 8, No. 10, pp. 3011-3019.

[29] Caldwell, Cam, Rolf D. Dixon, Larry A. Floyd, Joe Chaudoin, Jonathan Post & Gaynor Cheokas, "Transformative Leadership: Achieving Unparalleled Excellence", Journal of Business Ethics, 2012, Vol. 109, pp. 175-187.

[30] Kesting, Peter, John P. Ulhoi, Lynda Jiwen Song, & Hongyi Niu, "The Impact of Leadership Styles on Innovation Management-- A Review and a Synthesis", Journal of Innovation Management, 2015, Vol. 3, No. 4, pp. 22-41.

[31] Aime, Federico, Stephen Humphrey, D. Scott Derue, & Jeffrey B. Paul, "The Riddle of Heterarchy: Power Transitions in Cross-Functional Teams, Academy of Management Journal, 2014, Vol. 57, No. 2, pp. 327-352.

[32] Ton, Anh Don, Gabor Szabo-Szentgroti, & Lazlo Hammerl, "Competition within Cross-Functional Teams: A Structural Equation Model on Knowledge-Hiding", 2022, Social Sciences, Vol. 11, No. 30, pp. 1-16.

[33] Sternberg, R., J. Kaufman, & J. Pretz, "A Propulsion Model of Creative Leadership", Creativity & Innovation Management, 2004, Vol. 13, pp. 145-153.

[34] Wong, S., "The Role of Management Involvement in Innovation", Management Decisions, 2013, Vol. 51, pp. 709-729.

[35] Dajci, Gerti, & Tatjana Elezi, "Analyzing Innovative Teams through a Product Innovation Process", International Scientific Journal Monte, 2021, Vol. 4, No. 2, pp. 63-67.

[36] Pearce, C., C. Manz, & JR Sims, "Where Do We Go From Here?: Is Shared Leadership the Key to Team Success?", Organizational Dynamics, 2009, Vol. 38, pp. 234-238.

[37] Lornikowa, N., M. Pearsall, & H. Sims, Jr., "Examining the Differential Longitudinal Performance of Directive Versus Empowering Leadership in Teams", Academy of Management Journal, 2013, Vol. 56, pp. 573-596.

[38] Mehra, A., B. Smith, A. Dixon, & B. Robertson, "Distributed Leadership in Teams: The Network of Leadership Perceptions and Team Performance", Leadership Quarterly, 2006, Vol. 17, pp. 232-245.

[39] Grote, Markus, Cornelius Herstatt & Hans Georg Gemunden, "Cross-Divisional Innovation in the Large Corporation: Thoughts and Evidence on its Value and the Role of the Early Stages of Innovation", Academia, 2012, pp. 1-15.

[40] Smith, B., R. Montagno, & T. Kuzmenko, "Transformational and Servant Leadership: Content and Contextual Comparions", Journal of Leadership and Organizational Studies, 2004, Vol. 10, pp. 80-91.