Impact of unrecognized knowledge-gatekeepers and lack of job rotation in Product Development Process of growing organizations.

by

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Submitted to the System Design and Management Program
in Partial Fulfillment of the Requirements for the Degree of

Masters of Science in Engineering and Management

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

May, 2015. [June 2015]

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Abstract

In technology oriented organizations like those enclosed in the Automotive Industry, effective communication and collaboration are core competencies that, when properly managed, generate a constant flow of information and ideas that can keep activated the innovation process inside the organization. The complex architecture of the communication systems and their close relationship with the organizational structure have been previously studied to help organizations improve their communication and overcome their own unique challenges.

In this thesis, I review the communication system of a Product Development Organization (PDO) along with the influence that the organizational structure has in the communication process complexity. I explain how the opportune identification of the key individuals in the communication system that serve as gatekeepers of the technological information is critical to the success of product development processes and innovation progress.

Finally, a survey in an automotive PDO was conducted with the aim to understand how the communication system currently works and integrate the technological gatekeeper concept as a strategy to reinforce the transfer of technological information that increases effectiveness of execution along with innovation.

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Acknowledgments

First and foremost, I would like to thank my beloved parents Elodia Morales and Javier Almazan, to whom I am incredibly grateful for their unwavering love and support; which extends to my whole life. Also to my amazing siblings Perla and Javier who inspire and support me in all my life journeys. I am deeply grateful for the family to which I belong. From the depths of my heart, thank you to all of you.

This experience has been enriching but also challenging. It has marked a radical change in my professional career and in my perspective on life. I will be always thankful to those who were with me and helped me to make from this journey something extraordinary.

My dearest friend, Demelza, for her constant and unique support, for listening me and help me to build the courage to ignore the annoying inner critic. Thank you

My incredible friends, Edith, Zvi, Javier, Bere, Consuelo, Vane, Irving, Mary Chuy for your unconditional presence, your candid words, and you honest friendship. Thank you for making me smile.

Jannet López, my Ford mentor, for her trust and support, for speaking up for me and help me to get this invaluable opportunity. Thank you very much.

Ford Motor Company, for giving me the support and opportunity to be part System Design and Management (SDM) program at MIT.

My partners in this journey. I can say with confidence that without you this wouldn’t be as inspirational as it was:

Daniel Camacho, for sharing your philosophy on life and teach me not to worry too much.

Phatty Arbuckle, for her cheerful attitude and irreplaceable friendship.

To all my friends and relatives that always had a kind gesture of support.

And last, but certainly not least, I would like to thank my thesis advisor, Patrick Hale, for your unconditional support and advice, for his patience, guidance and wisdom that helped me to develop this work and make wiser decisions for my professional career. Thank you.

THANK YOU
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List of Acronyms

PDO - Product Development Organization
PDP - Product Development Process
PDE - Product Development Engineers
PDD - Product Development Department
CAD - Computer Aided Design
CAM - Computer Aided Manufacturing
AuCo -Auto Company
U.S. - United States of America
ISE - International Service Employee
BE - Body Exterior
BI - Body Interior

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Chapter 1 | Introduction

1.1 Motivation

It is well known that one of the most valuable assets for an organization is its personnel. Personnel become even more important in the particular case of product development, especially for companies with significant plans of growth.

Along my professional career, I have been affiliated to international companies that constantly pursue growth, looking to become the next most profitable partner. I have been part of the challenges implied by the product development process which takes a young organization to the next level of evolution where business expertise and technical knowledge are decisive for the maturity of the organization. Also, I have witnessed how the transfer of information and knowledge, among experienced people within the company and those who came from “outside”, had a high relevance in the acquisition of business, technical expertise, innovation and technology development inside the organization, influencing its maturity in diverse aspects.

The required training, to pursue a Master of Engineering and Management degree in the System Design and Management (SDM) program, provided me the skills to understand, from a holistic point of view, significant opportunities within a growing organization. Now I am able to redefine organizational architectures that include the transfer of information and knowledge seeking to synchronize the growth outlook with the maturity requirement.

I’m convinced that awareness of the positive effects, from information and knowledge transfer onto the product development process, can reduce uncertainties frequently leading recognition resistance of the following:

1. The need of the communication process as an innovation and technology development driver
2. The lack of equilibrium between successfully developed “today” while planning and innovating for the “future”.
Thus two questions came to act:

1. Within a Product Development Organization (PDO), what would be a good approach to identify strengths and weaknesses of the current communication process and its value in the transfer of information and knowledge?

2. Which are the organizational actions to realign the communication process to become an effective driver of innovation, technology development and organizational maturity and who are the key individuals involved?

1.2 Thesis Objectives and Hypothesis

As mentioned in the previous section, the motivation for this work comes from a strong interest in the communication process inside product development organizations (PDOs). Taking advantage of my personal professional experience, the automotive industry will be used as a frame to develop this work.

In the automotive industry, as in many other industries, one of the most effective ways to convey internal and external knowledge and to keep up with the pace of innovation and technological growth is via the communication system inside the organization. The focus of this work is to analyze the importance of the role of experienced knowledgeable personnel in the transfer of information and knowledge within the communication system as part of the product development (PD) architecture process.

The purpose of this thesis is:

To achieve a better understanding of the interactions and dependencies between regular employees and those, insiders and outsiders, with access to a large amount of information and a high level of knowledge and experience; and how the awareness and thoughtful management of those interactions and dependencies influence the innovation and technological growth. The results must drive to an improved understanding of the role that the highly informed and knowledgeable personnel has in the communication system inside a PDO.
The premises that will provide support and guidance to the discussions are:

i. Strengthening the communication culture, focused on how stimulating the transfer of information and knowledge in an emergent PDO can improve innovation and technological development inside the organization.

ii. Communication processes, recognized and managed as part of the current PDP to enhance the organization to speed maturity pace.

1.3 Methodology

The methodology followed in this work will prove the premises previously stated in section 1.2. The roadmap considers:

- **Systems Architecture & Systems Engineering**: The principles in system architecture and systems engineering will be used for an accurate definition of the boundaries, context, stakeholders and requirements of the communication system; as well as the correct understanding of the complexity of the system. Understanding roles and responsibilities.

- **The Gatekeepers Theory**: Literature reviews on effective communication practices, structural organization, models and theories with guidelines for improving innovation and technology transfer.

- **Technology Strategy**: Understanding the role of technology transfer in the PDP to effectively capture value for the organization.

- **Innovation & Management**: Understanding of interactions inside the Product Development Department (PDD) and the relationship with innovation and technology rapid change for fast growing organizations.

- Interviews and surveys conducted to identify current interactions and possible Gatekeepers in the network.
1.4 Thesis Structure

The arrangement of the chapters has been carefully chosen to provide a logical structure of the communication system and the specific role of the technological gatekeeper throughout.

Chapter 2 | The communication system

This chapter is focused on the description of the communication system and the theoretical concept of the technological gatekeeper from the literature point of view. It offers a translation of the theoretical description into the PDO framework and provides a general revision on the main characteristics of the technological gatekeeper under PDO settings.

Finally, it provides a description on overlapping of communication, technology transfer and innovation.
Chapter 3 | Finding the Gatekeepers

A combination of product development theory, systems engineering principles, and the gatekeeper theory is used to deliver a deeper analysis on the technological gatekeeper role and the close relation with the communication system within PDOs.

This chapter touches the management side of the gatekeeper role, the importance of its recognition and possible ways of motivation.

Chapter 4 | Application: Managing Innovation in Ford Mexico

The result of surveys and interviews performed in a growing organization are combined and aligned with the theories and concepts described in the previous chapters. Interpretation and discussion on the findings are presented. It aims to incentivize future considerations that result in improvements of the communication systems from the PDO analyzed in this work.

Chapter 5 | Conclusions and Recommendations

This last chapter encompasses the conclusions that result from a holistic view of the ideas, theories and concepts described in this work. Also, it provides some recommendations for future actions and research.
Chapter 2 | The Communication System

"To deal successfully with work-related uncertainty, organizations must efficiently gather information from external sources, process and disseminate that information within the organization, and transmit data back into the environment."

(Katz & Kahn, 1966; Thompson, 1967)

This chapter describes a general understanding of the communication system components within an engineering based organization. It provides an overview of the related theories that have addressed the fundamentals of the communication system and its impact in the development process.

2.1 Communication as a System

The communication process is a complex process, naturally embedded within the product development system in any organization. Because of its contribution to the growth and evolution of the organization, significant research has been done around it to comprehend how it works and how it can be improved to maximize the benefits of the organization.

As every organization is different from the others, so it is their communication system; however, there is a basic communication model that remains constant. This basic model refers to the one defined by Shannon and Waver (1948), where the communication process is described as the basic process of transferring information from one part (source) to another (receiver). While this simplified definition does not provide a thoughtful conceptualization of communication as a concept, it points out the main elements of the process: The sender, the message, the medium (or channel) and the receiver (Ewing, J., 2014).

Under an organizational framework, these elements of communication will be responsible of the information flow through the channels that run from different and diverse sources to different and diverse receivers that can be internal or external, and can interchange its function as a source or a receiver.
Figure 2. Basic Communication Model.
Adapted from Shannon and Weaver Model

The communication system is strongly influenced by the architecture of the organization. The architecture of each organization will state the way in which its elements are related to each other and to the environment to perform a function. (ESD.34 Systems Architecture Lectures, Fall 2013)

The basic communication process, represented in Figure 2 represents one method of interrelation among the components of the organization. According to Niklas Luhman’s system theory “each system consists of countless meaningful communications” (N. Luhmann, 1984). The countless repetition of the basic communication process structured by the organization’s architecture is what I describe as the communication system of every organization.

In terms of project execution, the communication system has been identified as a core element of successful organizations. Its relevance has been recognized in connecting all members with the strategies and actions that will lead the successful achievement of each specific goal of the project. For example, the 2013 Pulse of the Profession report from the
Project Management Institute (PMI) revealed that organizations with an effective communication system “perform higher, completing an average of 80 percent of projects on time and budget... and risk 14 times fewer dollars than their low-performing counterparts.” (PMI, 2013). A wide number of articles supporting the fact that the communication system is crucial for the optimal performance of organizations can be found without big effort; but, due to the complexity embedded into the communication system, few of them dive deeper into the specifications of what they call an “effective communication system”.

In accordance with Systems Thinking theory, a “system is a set of elements or entities, and their relationships, whose functionality is greater than the sum of the individual entities” (E. Crawley, 2013). Under this definition of system and the communication model previously described, an effective communication system would be the one where the initial source of communication (element) is successfully transmitted (interrelation) from the transmitter (element) to the receiver (element) and successfully received (interrelation) to be retransmitted.

In this work, I primarily focus on two of all the elements of the system: the transmitter and the receiver. It must be consider that, in accordance with the model described earlier, after the receiver owns the transmitted information, it becomes the transmitter of a revised version of the information. The revised version can return in a feedback loop to its origin or can reach a new receiver to initiate a new communication process.

2.2 Communication Structure

The development of products that result in high complexity systems demands a high interaction process that involves hundreds of personnel from diverse backgrounds, disciplines and hierarchy levels; this interaction process grows along with the maturity, learning and evolution of the organization (Gulati, R. K., & Eppinger, S. D., 1996). Thus, the recognition of border lines among teams, disciplines and hierarchies in organized units facilitates a clear understanding of the product architecture and the structure of the organization. This becomes crucial in the successful execution of all projects. However, in complex systems, the overlap among the different groups is necessary and a pillar for productivity.
In high complexity systems such as PDOs; although it would be ideal, it becomes practically impossible to replicate the basic communication process in a one-to-one scheme.

Considering that most organizational structures abridge to combinations of the 3 Primary Organization Structures (Figure 3) (Andy Yap, Managerial Psychology Lectures, 2014). The communication process becomes a system of incremental complexity connected to the evolution of the organization.

Each structure has strengths and weaknesses. A functional structure cultivates specialists but drives a reduced inter-functional collaboration. A market-based structure, instead, results in a good cross-functional coordination but has less specialized skills development. Lastly, a matrix structure has a strong linkage among divisions which results in a high number of interactions that can be complicated to handle.

In terms of communication, these structures outline the initial architecture for the communication system determining how information will flow across the organization. If the high communication system level is represented in terms of the interrelations that exist in a fully-communicated organization, the representation will display a proportional complexity as it is shown in figures 4, 6 and 5 respectively:

*Figure 3. Three Primary Organization Structures*

*Source: Andy Yap, MIT Sloan School of Management, 2014*
Figure 4. Functional Structure Communication System Representation

Figure 5. Matrix Structure Communication System Representation
To reflect the peer-to-peer interaction at all levels, the previous high level representations should break down the increasing complexity of the system. Certainly a fully interconnected organization is not representative of a productive organization. Unstructured communication can drive inefficiencies in project execution; hence the importance of the proper identification of the relevant interconnections among individuals carrying relevant information inside and outside the organization.

Who is transmitting information inside and outside the boundaries becomes even more important in technology-driven organizations. R&D and engineering based companies have more and more specialized personnel who carry valuable knowledge and transfer just a few portion of it to the organization. Despite the efforts in project coordination and planning, the use of indirect
channels where information is shared through intermediaries (for example, a supplier discussing manufacturing specifications with an engineer who eventually will provide the information to the designer) cannot be eliminated from PDP process. Many organizations tend to ignore and underestimate this aspect of the process.

2.3 The Gatekeeper Theory

"The gatekeeping theory is embedded in systems theory as the study of systems of interacting components where information or decisions flow through a series of institutional relationships to produce a result. Gatekeepers as part of this system have the power to stop or continue the flow of information or decisions.” (Harris, Rebecca, 2012)

Although the gatekeeping theory was mainly applied in media and mass communication (White 1950, Gieber 1956) it was also embraced by other fields like management (Thomas J. Allen, 1970). Allen’s research addressed the importance of acquisition and dissemination of information in organizations and observes the particular case of information coming from outside the organization through informal person-to-person interaction (Allen. 1984). In management, as well as in other disciplines, this theory keeps its centrality in the role of the key individual who is exposed to larger and diverse sources of information: the gatekeeper.

2.3.1 The Gatekeeper

"The phenomenon of the gatekeeper is not an isolated one. Rather it is one example of a much more general class of phenomena. There will always be some people who, for various reasons tend to become more acquainted with information sources outside their immediate community. They either read more extensively than most or develop personal contacts with outsiders. A large proportion of these people in turn attract colleagues from within the community who turn to them for information and advice” (Allen, 1977)
In previous research, it has been recognized that the existence of specific individuals that perform the role of information transmitters at different levels inside and outside the organization. Such individuals are commonly called “informational gatekeepers” (Tushman & Katz, 1980).

The term gatekeeper was introduced by the psychologist Kurt Lewin (1951). Lewin introduced the concept of “gatekeeper” as the individual who controls what “items” can enter or not through a certain channel. The term has been widely discussed, adopted and adapted by diverse fields from sociology to information science. In the field of management, Thomas J Allen (1970) introduced the concept of technological gatekeeper as “the intermediary agent integrated into two information network of users” (Allen, T. J., Piepmeier, J. M., & Cooney, S., 1970). Allen claims that all organizations depend on the relevant technology that comes from outside and that most of them assume an uncomplicated and easy-to-understand information flow when information is imported (Allen, 1970). When information from outside is brought into the organization is when the communication process matters the most. The gathering and efficient transmittal of information from outside the organization to the inside and back, is of high importance to reduce the uncertainty embedded into the work related activities. (Katz and Tushman, 1979). Today, it can be argued that advances in communications technologies have facilitated the exchange of information; while that is true in many ways, the technology have had a deeper effect on the communications channels: it is not releasing in a significant way the importance of transmitter and receiver in the process.

In the communication process within an organization, the technological gatekeeper plays the role of both transmitter and receiver. As a transmitter, the gatekeeper applies a decision making process on what information it will provide or retain (Shoemaker, 2009) while as a receiver it will decide what information to process or discard. The impact that these decisions have in the organization, in terms of communication, can mark the difference between success and failure of organization projects (Y. M. Ebadi and J. M. Utterback, 1984).

In a highly competitive landscape, like almost all technology-driven organizations are in today, knowledge and information have become a highly valuable asset: thus organizations must be more interested in taking a closer look to the sources of this information and the methods of
transfer. Unfortunately, with a heavy workload, shrunken project timelines and highly competitive conditions, there is no room left to look for methods to effectively transfer relevant information, producing “waste” of time instead of bringing benefit to the correct project execution. The Gatekeeper has been recognized as an information-controller, decision maker and a communication process masterpiece, which points to be a good strategy to spread relevant knowledge and information across organizational boundaries. But what makes gatekeeper a Gatekeeper in technology-oriented organizations? This question can lead to infinite discussion, therefore in this work I put together what I believe are the most relevant characteristics from previous and current research that identified a technological gatekeeper.

<table>
<thead>
<tr>
<th>Characteristics of the Gatekeeper</th>
</tr>
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<tbody>
<tr>
<td>1. Facilitates information transfer by informal communication (Allen, 1969)</td>
</tr>
<tr>
<td>2. Acts as intermediator between source and applied knowledge (Tushman &amp; Katz, 1980)</td>
</tr>
<tr>
<td>4. Heavily supports the promotion of communication of technological information (A. Wilkin, 1974) along all the stages of a project.</td>
</tr>
<tr>
<td>5. Gathers, understands and is capable to translate information to the organizational internal language. (Tushman &amp; Katz, 1980)</td>
</tr>
<tr>
<td>6. Holds a position within the organization where he has a high interaction with insiders and outsiders. (Allen, 1977)</td>
</tr>
<tr>
<td>7. Has a high level of credibility funded by expertness and trustworthiness. Is persuasive but approachable (Hovland, 1953)</td>
</tr>
<tr>
<td>8. Has a holistic systematic interpretation of problems (SDM Systems Architecture Lecture, 2014)</td>
</tr>
<tr>
<td>10. Keeps a constant and voluntary effort to be knowledgeable about recent technologies and their applications.</td>
</tr>
</tbody>
</table>

Table 1. Gatekeeper’s characteristics under business organization settings.
Although, these characteristics might vary depending on the organization’s settings, those listed in Table 1 must be present to some extent in order to classify an individual as a technological gatekeeper inside a PDO.

2.4 Communication, Technology Transfer and Innovation

"The overall pattern of the innovation process can be thought of as a complex net of communication paths linking the various stages of the process."

(R. Rothwell & A.B Robertson, 1973)

The connection between technology transfer and communication seems to be a straightforward relation. The flow of technological information and knowledge inside an organization is embedded in the process, and comes as a natural part of the development of innovative products and services. But anyone who has been part of a PDO knows it is not that simple.

The constant threat of being consumed by the next disruptive innovation keeps all PDO in an alert mode, forcing them to look for all conceivable ways of either being the innovation disrupters or being flexible and robust enough to quickly adapt to the disruption (Clayton M., Christensen, 1997). Creation or quick adoption are the main alternatives for PDOs to keep up the pace in the race of technological innovation; and an effective communication is undoubtedly the transportation system that information and knowledge required to survive the race.

Carter & Williams (1959) after an analysis of the adoption of innovation in 152 different firms, listed 24 main characteristics that determined the "technological progressiveness" of the firm (Table 2). From these characteristics, at least six of them are directly related to information flow:

1. Good information sources.
2. No secretiveness.
3. Readiness to cooperate.
4. Good coordination.
5. Enough intermediate managers.
The first three of these six characteristics are used in this work as breakpoints to provide further detail on the merging edge of communication, technology transfer and innovation and how the technological gatekeeper, as it has been defined in Chapter 2, has a significant participation on the achievement of the "technological progressiveness" in a PDO.

1. **Good information sources.**

   It has been stressed through constant research that no organization is capable of generating all the knowledge and technology they need only from inside sources (Allen, 1984). Eric Von Hippel (1987) describes what he calls "functional source of innovation" as the source of some benefit from an innovative product, service or process. Von Hippel explains that it is a dynamic source that varies accordingly to the development process. For example, in an organization where the main business is building cars, the "functional sources of innovation" would vary through the PDP from research centers - who look for new technology and applied science - to suppliers - supporting the efforts for finding new-low-cost-profitable solutions - or even to the final users - who provide feedback with ideas of how to fulfill their needs in better ways.

   But what matters the most is how the information and knowledge coming from those sources reaches the correct *receiver* inside the organization, so that "information turns into a valuable asset". In comparison with other methods such as written or digital documentation of the information, which are unarguably important, the transfer of information through individuals with the characteristics described on Table 1 is more likely to have an impact in the PDP since the information is already modified from the original source to be applicable for a specific purpose in benefit of the product, process or service.

2. **No secretiveness.** Under the highly competitive settings that PDOs confront today the restrictions on sharing information become more and more strict. Confidentiality policies, Trade Secrets and Information Security are just few of the tools that are commonly used to protect valuable information in organizations. In addition to that, as technology is more deeply attached to the development process, an specialized language added some difficulties to the flow of information across
PDO boundaries. Thus, the knowledge transfer becomes a bigger challenge and organizations should prepare for it. The correct identification of technological gatekeepers, as transmitters of the information and knowledge from the inside at the time they are exposed to the technology and ideas from the outside should be considered a feasible strategy.

3. Readiness to cooperate. Strongly related to the previous point, the accelerate evolution of technology sets the pace for information flow. Accordingly to James M. Utterback (1971) there are three main factors that are tightly related to the process of technological innovation within a company: “1. characteristic of the organization’s environment, 2. internal characteristics of the organization itself and 3. flows between the organization and its environment.” (James M, Utterback, 1971) From the environmental factors, Utterback refers to the existence and communication of technological information as some of the factors that could possibly limit the innovation within an organization. He recognizes that the process of communication takes its initial phase through key individuals within the organization: the technological gatekeepers. These findings haven’t change as of today’s settings, on the contrary, they reinforce the idea of reconsidering the opportunities that the identification of these key elements can have to get the PDOs ready to interchange information.
Chapter 3 | Finding the Gatekeepers

At this point, I have provided an overall description of the technological gatekeepers, their presence in the communication system and the tasks they commonly perform as part of what can be a strategy to manage the flows (in and out) of technical information and knowledge, and in consequence the innovation within a PDO.

As mentioned earlier, the communication system is outlined by the PDOs architecture and therefore unique for each organization; the ways the gatekeepers are developed along the development process are also customized by the PDP. But one condition remains constant in the way of transferring information through the gatekeeper. It is predominantly an informal way. Thus properly identifying the technological gatekeepers can represent a challenge for the management.

3.1 Gatekeepers in Growing PDOs.

Before getting deeper into the identification of the technological gatekeeper, it is relevant to narrow the scope of the PDO framework so it can be easier to understand the conditions that lead to informal information flow.

Organizations are constantly responding to the economic, technological and socio-political factors that drive the competitive market. Their structures have been flattened and their strategies to insert innovation in their DNA have been adopted to increase their abilities to respond to the changing needs of their stakeholders. As part of their efforts, many organizations have looked for market opportunities and general resources (such as suppliers) in other regions and established affiliates there. The effects that these actions entail are directly reflected into the PDP dynamics.

If a general PDP framework (Figure 7) is considered and aligned with the PDO core divisions, the expected interrelations in each stage of the PDP would be such that the information among them flow in all-to-all configuration; not with communication-only purposes as previously represented, but to deliver specific information related to the function that each division must perform to the successful achievement of the organization (Figure 8). Adding the
factors of change (structural hierarchy, location, new affiliates, etc.), the expected information flow becomes more compounded as each core division breaks down in teams that might be governed by different circumstances, despite of being part of the same PDO. Then, distance, culture, language and timing among other factors become part of the scenario or increase in difficulty if they were not already part of the system.

*Modified from ESD 40 Lectures (Ulrich and Eppinger, 2012)

**Figure 7. Generic PDP Framework**
Even though some difficulties come with the growth and globalization of PDOs, there are some benefits enclosed too. Creativity, worldwide knowledge, new perspectives and ideas are some of them (ESD.36 Lecture, de Weck, 2013). But the proper management of these new resources is indispensable to convert them into valuable assets for the organization such as new methodologies, strategies, process or products or the considerable improvements of the existing ones.

It is evident that information distribution and effective communication among the multicultural in-site and off-site teams is a leverage point for the PDO. PDOs have found in technology a considerable support to close the gaps between in-site and off-site teams making possible the transfer of information among them. Email, videoconference software, digital data...
bases, computer aided design & computer aided manufacturing (CAD & CAM) packages, among other technology-based communication, are some of the tools on which PDOs rely to keep an active flow of information.

The fact that technology provides a significant assistance it doesn't eliminate the need of face-to-face communication.

In recent studies Allen (2007) defined three types of communication present in organizational environments:

I. **Coordination** - Communication to coordinate work

II. **Information** - Communication to maintain staff knowledge of new developments in their areas of specialization.

III. **Inspiration** - Communication to promote creativity

According to Allen's research, communication type I exists as part of the coordination needed to execute almost any project; type II plays a more important role in maintaining everyone up to date regarding the rest of the organization; and finally, type III denotes the communication of new ideas among individuals within their teams and with other teams inside and outside the organization (Allen, 2007).

Communication Type I, is not severely affected by distance due to the technological tools that can be used to complement the coordination process, but types II and III have a very different story. The process of communicating new technology developments and ideas to others implies a more complex process that can be hardly performed without face-to-face communication. Face-to-face communication allows individuals to overcome misunderstandings that can be caused by different factors such as culture, language or area of specialization. Allen’s research shows that engineers spend a significant amount of their time gathering information through personal contact than they do by other means. (Thomas J Allen, 1984); additional prove of that is what the expert on emotional intelligence “Daniel Goleman” said:

"Face-to-face interactions are information-rich; we pick up how to take what someone says to us not just from their tone of voice and facial expression, but also their body language, pacing, as well as their synchronization with what we do and say. Most crucially, our brain’s social circuitry mimics in our neurons what’s happening in the other person’s brain, keeping us on the same wavelength." Daniel Goleman, 2007
From there that I recall the technological gatekeeper concept as a strategy to efficiently manage this aspects along the PDP. I should mention that I'm not suggesting that one single person can solve the problems related to Information and Inspiration communication types; instead I'm proposing that the detection of these key transmitters and receivers of information can be seen as a valuable tool to leverage the organizational communication capabilities.

For organizations growing everything that has been said has a double impact; the three types of communication have to be carefully managed for the current company and for the future company that will result from the growth. Notwithstanding, growth carries some advantages that can pave the way for technological gatekeepers to arise. In the initial stage of a PDO the teams are small and the communication flows smoothly since the learning curve for the individual across different department behaves in a similar way. When the organization has progressed and has acquired enough knowledge to adopt new and more challenging projects, the ramping up process starts and the number of employees by the hand of the workload increases while the time and attentiveness in communications of type I and type II decrease. Under these conditions, those individuals that result in a position where they have to interact with different teams, department or/and divisions, will naturally receive more information from internal and external sources than the other positions within the PDO. Translated to the PDP it would be natural to think that, as these individuals hold a cross-functional position and receive information from different sources, they might be also responsible for the coordination and relationship among the sources. That is the case for many PDOs who have designated a specific role such as project management or program management engineers, but as I addressed earlier, coordination is a different type of communication. Communication types I and II are not dictated, they come from an informal and non-planned process of communication.

The identification of the technological gatekeepers must be considered at different levels in the organization. Previous studies suggested that, as a result of the position and the tasks executed along the PDP, the project supervisors could perform as technological gatekeepers. Despite of the applicability of this argument, nowadays PDOs supervisors face a significant number of responsibilities that go from administrative tasks, such as performance reviews for
each member of their teams, to the evaluation of cost reduction opportunities for their specific department. Thus, the gathering of technical knowledge and the transfer of it has been handed to those who directly achieve the PDP targets, the product development engineers (PDE).

3.2 The PDO & the Gatekeeper

"... the technologist must obtain his information either through the very difficult task of decoding and translating physically encoded information or by relying upon direct personal contact and communication with others" (Thomas J Allen, 2004).

Once the PDO has recognized the veiled need of continuously transfer technical information and knowledge as a strategy to foment creativity and innovation, the identification of the technological gatekeepers becomes an accomplishable job.

As with any other strategy, there are different tools that can be used to categorize the main elements to consider. The 7S model is one of them (Figure 9). The 7S model was created in the early 80s by Tom Peters and Robert Waterman as a tool to evaluate organizational alignment among 7 key factors in organizations. The theory behind the model claims that for an organization to be successful, all elements, soft and hard, must be balanced and mutually inclusive. The 7S model points out the importance of coordination over structuration for the achievement of the organization’s goals (Mckinsey Quarterly, 2008).
Using the elements of the 7S Model as a guide, the questions that lead to the identification of the technological gatekeeper can be formulated, thus each organization can tailor them to cover its particularities.

In a general framework the 7S elements are evaluated as shown in Table 3.

<table>
<thead>
<tr>
<th>HARD</th>
<th>SOFT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy</strong></td>
<td><strong>Skills</strong></td>
</tr>
<tr>
<td>• What are the organization’s strategic goals?</td>
<td>• Do the current expertise delivers what is expected?</td>
</tr>
<tr>
<td>• What does the organization do to be competitive?</td>
<td>• <em>What are the upstanding achievements of the teams/departments?</em></td>
</tr>
<tr>
<td>• How does the organization allocate the customer demands?</td>
<td>• What is the training in the organization?</td>
</tr>
<tr>
<td></td>
<td>• Are teams/individuals overachieving?</td>
</tr>
<tr>
<td></td>
<td>• How skills are improved in the organization?</td>
</tr>
</tbody>
</table>
### Table 3. 7S Model General Framework

Now, each question must be evaluated to guarantee the alignment and balance of the 7 elements. As part of this evaluation the characteristics of the gatekeeper previously presented on Table 1 should complement the answer to those questions, otherwise there might be some opportunity to create the conditions that give place to the technological gatekeeper to arise, and the evaluation of the questions should help to arrive to that conclusion.

After the evaluation of interrelation and balance derived from the 7s model the integration of the technological gatekeeper within the PDO framework can be summarized in a systemic representation (*Figure 10*) in the following manner:
3.3 Experts with leadership

Frequently gatekeepers are identified as experts or specialists (Allen, 1984), but not necessarily as leaders. Allen’s (1984) work describes that after internalizing the concept of the technological gatekeeper, it is more likely that the management can tell who the gatekeepers are within their teams, departments and organizations. The labor they execute, as highly knowledgeable and experience personnel, most of the times is recognized by the management as efficiency – in regards of the alignment of external information for the benefit for the organization– and overachievement – in regards of the assistance they provide to their peers.

Unfortunately, in today’s PDOs it might not be that easy for the management to tell who the technological gatekeepers are even after embracing the concept. As the complexity of the
PDP increases and more methodologies and procedures are put in place, the engineers that show dominance of communication of Type I (Coordination) along with the display of leadership skills have a better opportunity to capture the attention of the management than those who are more focused in acquiring and transferring new information and ideas across the organization. In technology-driven PDO’s, the integration of new technology and creative processes are commonly left in hand of special research groups (internal or external) which are barely related with the actual PDP, and know just a minor part of the implications within each stage that conforms it. As I have described through this work, it is the technological gatekeeper who helps to close the gap between the new technology, ideas and the possible applications in the PDP at the time. At this point I will argue that the leadership skills of the technological gatekeeper are as strong as those displayed by their peers in charge of the project coordination.

From a leadership perspective and using the concept of the leadership seesaw (Shalom, Saada S., 2013); where tasks (hard skills) dominate one side and people (soft skills) dominate the other; the technological gatekeeper description, as a technical and knowledge oriented person, would suggest that the gatekeeper is sitting heavily in the tasks side. Certainly, the tendency of the gatekeepers would be to incline the seesaw to the task side, as they have a natural fascination for technology and its applicability in the current process; but I have endorse how skillful they should be in terms of how they serve as receivers and transmitters of the information, and how they provide technical assistance to their peers, such that these skills help them to balance the people’s side of the seesaw (Figure 11).

*Adapted from ESD.31 Lectures, 2014.

Figure 11. Gatekeeper Leadership Seesaw*
The leadership style of the technological gatekeepers is an important factor for the management to recognize them as leaders, and it is a responsibility of the management to make sure that they are conducting in the right way the leadership of these individuals.

In fact, when the management succeed to recognize the leadership of the already discovered gatekeepers, it usually results in a promotion to a higher position in the ladder where the leadership style is misled. Thence, this is another important reason for the management to carefully identify the technological gatekeepers along with their leadership style.

3.4 Reward and Motivation

Once the technological gatekeepers in the organization have been discovered, their leadership style should be identify in an effort to get a deeper understanding of how to lead and motivate them without disrupting their performance. Like any other employee in the organization, the gatekeepers need to be rewarded for the accomplishments they have and coached to achieve new goals. As I have discussed, one of the particularities of this role is that it is performed in an informal basis; which can represent a problem for their superiors to find the right way to reward and motivate the employees performing the role.

According to Myers-Briggs Type Indicator (MBTI) personality test, introversion, extroversion, logic and intuition are just some of the characteristics that would define how the technological gatekeepers perform their job but also how their superiors perceive their performance. Most of the times, with the leadership style and the job performance as the baseline, the management will decide to promote the employee playing the role of the technological gatekeeper inside the organization. Right at this point is where the aptitudes of the gatekeeper are at risk. When the employees are promoted the role itself can be lost, the new responsibilities that come along with the promotion, and the interactions required by the new position, detach the gatekeeper from the sources of information and make him/her unavailable for the peers who used to look for some advice. Some will argue that this is the normal process of evolution within a PDO, but if the relationships that the gatekeeper builds inside and outside the organization, and the trust gained from its sources of information along his/her career are
taken into consideration, then it might be easier to visualize the impact that a promotion can have.

As an approach to solve the recognition problem for technical experts or specialists the “dual ladder” reward system has been used by organizations for a long time. (Allen & Katz, 1985) The dual ladder approach can be seen as an option to recognize and motivate those performing as gatekeepers. However, the decision whether to climb the managerial or the technical side of the ladder should be the result of a common agreement between the management and the employee along with a further analysis on the hard and soft skills required for the new position. Promotion can be one way to recognize gatekeepers for serving as receivers and transmitters of important information for the PDO, but other tactics should be formulated by the management to fulfill this need. Few chances are that climbing the ladder would be enough to keep the technical experts motivated, and that is why I reiterate the importance of understanding the leadership styles of the technological gatekeepers. Only the understanding of what motivates them intrinsically will provide the management enough information to keep these particular employees motivated. (Leadership: The Missing Link Lectures, 2014)

Actual research and multiple study cases (Ralph Katz, 2005) (Zappos Case Study, 2014) have shown that the degree of motivation is deeply influenced by how much the employee enjoys performing his job. In the case of the technological gatekeeper, the interaction with new sources of information that reinforce his/her curiosity for new technology, and give him/her the opportunity to talk about it represents a considerable portion of the satisfaction of performing the role. In consequence, a good way to preserve these characteristics of the job appears to be keeping the employee engaged as a technological gatekeeper. Therefore one of the alternatives to consider, as a strategy to preserve high motivation levels, could be the planned rotation among different job positions within the organization.

Growing PDOs are in a constant effort to get bigger projects and a good portion of the budget is reserve for that purpose. Although promotions might be present in more frequent basis than in more mature organizations, new hires who can meet the new project requirements in terms of workforce are always the priority, and in that case, other options should be consider to fulfill the need of recognition and motivation of the technical experts.
According to research previously conducted, job rotation can be used for improving work experience and career development. (Campion, M. A., Cheraskin, L., & Stevens, M. J., 1994). Also, for organizations that require specialists due to the product complexity, as in the case of most PDOs, job rotation can be seen as a company approach to substantially exposure employees to corporate processes and broader work experiences (Sonnenfeld, J. A., & Peiperl, M. A., 1988) (Conger, J. A., & Fulmer, R. M., 2003).

Reward & motivation strategies are not straight forward processes, job rotation and dual ladder promotion are just two options that might be considered by the management, but as I have already mentioned, it requires a deeper understanding of intrinsic motivation factors and their alignment with the company’s vision.

Chapter 4 | Application: The PDO Case

In this chapter is presented an overall analysis of a PDO in the automotive industry, which I will refer as the Auto Company (AuCo). AuCo has grown considerably in the last years and still has plans to keep growing in the near future. The fast pace of growth of AuCo has challenged its engineers to learn by executing. The aspiring plans of the management have stressed the PDP demanding the delivery of complex tasks in short periods of time, forcing the engineers to use all available resources to gather the information they need to reach the deadlines on time and with high quality. With the literature reviewed previously and the observations from a survey and interviews I provide some evidence of the informal communication that is taking place in this PDO as a result of the described conditions.

4.1 Company Background

AuCo is an affiliate in Mexico City of a major car manufacturer with main offices in the U.S. In the last 6 years, and particularly in late 2008 (when the automotive industry entered an economic crisis), AuCo became an important partner and with that came a considerable growth, especially for the PD division as most of the projects relied under its direction. AuCo grew from approx. 400 employees in 2009 to nearly 1,000 by 2014.
The main work performed by AuCo has been focused in the development of specific subsystem components and the general support to the PDP. At the initial part of the growth both activities were extremely challenging due to several factors that included the inexperience of the engineers, the location of the main offices, the different languages spoken by all the participants of the projects and - despite being of the same organization – the organizational culture.

AuCo’s organizational structure is predominately functional with some influence of the matrix and market-based structures. AuCo main operations include Product Design and Development, Vehicle Engineering, Vehicle Evaluation and Verification, Purchasing, Cost Estimating, Manufacturing, Marketing for local markets, among others; and is involved in two main businesses: the regular market products (Bus A) and the luxury market products (Bus B). The scope of the analysis in this work encloses only the Product Design and Development Division (PDD) (Figure 12).

The PDP and expected flow of information frameworks in AuCo, comply with what I already described in the section 3.1 of this work. The organization is structured in alignment to the expected outcomes of each phase in the PDP; the participation of the different areas along the development process is carefully determine by the internal PDP by which product deliverables and timelines are defined.

Figure 12. AuCo PDD Organizational Structure
4.1.1 AuCo Organization and Communication Structure.

AuCo’s organizational structure (Figure 12) is the baseline for the communication system inside the organization. Management divisions are arranged simulating the car subsystems structure. For example, there is a medium level management assigned for the design and development of the exterior body of the car; this level breaks down into teams in charge of components such as doors, bumpers, roof, and lamps and so on. In a similar way, a multilevel team is assigned for the design and development for the interior body, with teams assigned for seats, carpets, instrument panel, and so on (Figure 13). Each area along with its teams has a clear goal to achieve, while the doors team understand that they are responsible of delivering two front and two rear doors (for an average sedan version of a car) the management level understand that the area is responsible of delivering the complete “shell” of the car. However, the shell is not an independent entity, the areas and their goals are interrelated. BE will design a door that fulfill the desired style of the car-design, and BI will make sure that the armrest, the window glass, the door-handle and all other subcomponents fit into the door shell. Therefore, as components and subcomponents are interconnected so it is the personnel in charge of them and the way they connect to each other is communication.

AuCo, doesn’t have the capabilities to be in charge of the full design and development of all components. Thus, AuCo works with the main offices of Product Development in the US and other affiliates such as those located in China, Spain and Germany to deliver a final product. This means that the communication structure of AuCo goes beyond the internal members of the organization making it a much more complex communication structure.
During the last six years AuCo has been able to successfully handle the product development complexity and overcome the challenges derived from working with affiliates in different regions. However, in the recent years the top management has recognized that internal and external communication deficiencies has been the source of different irregularities along the PDP for many of the components they lead and it has become crucial to work on strategies that can help the company to improve internal and external communication.

The principal approaches that AuCo took to tackle the communication problem so far are:

- Increase the training for engineers in an effort to make them more capable of understanding and manage the technicalities of subsystems, components and subcomponents associated with their owned component(s).
- Assign additional budget per area for a traveling agenda that allows engineers to work in a face-to-face with their counterparts in other locations.
Enroll high-performance engineers in the International Service Employee (ISE) program to perform as main contacts with other locations, learn the know-how from their perspective and as their return to the host country share their knowledge and expertise.

Although these strategies gave results in the initial stage of growth, as the company size increased the strategies became less effective, and side problems that weren’t anticipated initially—such as the drop of employee retention rate—became major concerns.

The one ladder approach that AuCo embraces has resulted in an imbalance in the low and mid management levels. Employees with strong technical skills but poor soft skills are leading teams of, in their majority, young engineers with a strong desire for professional growth; and on the other side, employees with strong soft skills but limited technical skills are struggling to provide the technical support that their engineers need to successfully achieve their objectives. Another side effect of the promotion system, in combination with inexperience and workload, has been the emergence of competitive environments where the engineers become “selfish” with the technical information causing divisions among areas, and sometimes among teams in the same area.

4.1.2 AuCo Human Resources Background

For AuCo the alignment of the local human resources department with the corporate global standard is a priority. The management recognizes the value of its workforce and constantly develops local initiatives to offer aggregated benefits to its employees. But despite of the efforts, as a consequence of the speed of growth AuCo hasn’t been able to find a balance for important factors such as career development, economic compensation, workload, employee motivation and promotions.

AuCo maintains competitive salaries and motivates engineers with high performance by diverse rewarding tools like peer to peer recognition, high-performance bonuses and recognition gift cards. Promotions are also consider as a tool to keep employees motivated but require more than
high performance in daily work. In order to be promoted, employees need to comply with some conditions including technical expertise, seniority and the vote of the majority in the committee in charge to evaluate the proposed candidates for the position.

In AuCo the one ladder model prevails in the first 3 or 4 upstream levels, thus without distinction of technical preference, professional growth within the company means to become a supervisor and later a manager. It is at higher levels of management where the ladder splits and the technical and functional distinction is made and employees can become technical chief engineers or functional chief engineers. Though, the number of positions at these levels and what it requires to get there take most of the current employees outside of their scope.

Also, due to the particularities of each component in terms of design, development and manufacturing the employees that have gained expertise and significant technical knowledge are seen as essential for the area, therefore job rotation programs to keep them motivated is the option considered last by their superiors. From interviews with high performance engineers at AuCo, the great resistance from the management to allow high qualified employees to make lateral movements is a considerable source of discontent and demotivation.

4.1.3 AuCo Future Challenges

In addition to possible solutions to the communication problem that AuCO has already recognized, actions that can potentially drive innovation within the company has been demanded by the top management.

Innovation has been identified as one critical factor of comparison among the different affiliates and sometimes a decisive factor to get bigger projects. The top management has pointed out the urgency of becoming more innovative while becoming also more technically specialized.
4.2 Solution strategy approach.

I conducted a survey and some interviews with AuCo engineers, supervisors and managers as an effort to identify the current behaviors that can provide meaningful insights for the development of a solution strategy that helps AuCo to improve the communication system and take actions that can possibly drive the growth of innovation.

4.2.1 Survey and Findings

The survey had as main objective to understand how AuCo’s engineers are currently interacting and collaborating to transfer information and what the role of management is. It was distributed with the management’s authorization and the answers were kept anonymous unless the employee voluntarily provide his/her name.

What I describe next is the answers of 195 employees from diverse areas within the PDD division. Survey details can be found in Appendix B.

General Facts

- Number employees that answer the survey (N): 195
- Employee’s age distribution’s in PDD:

<table>
<thead>
<tr>
<th>Age range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18 to 24</td>
<td>17%</td>
</tr>
<tr>
<td>25 to 34</td>
<td>59%</td>
</tr>
<tr>
<td>35 to 44</td>
<td>15%</td>
</tr>
</tbody>
</table>

Table 4. AuCo’s employees age distribution.

- Respondents Functional Team Distribution:
- Predominant areas of respondents: Body Exterior, Body Interior, Vehicle Engineering and CAD.
Figure 14. Respondents Functional Team Distribution

Seniority

For how long have you been part of the organization (Mexico)?

N=195

Figure 15. Seniority within the company.
For how long have you been in the current position?
N=195

Figure 16. Seniority within job position.

More than half of the respondents within PDD (63%) joined the company in the last 3 years; although some of the new hires come from other automotive companies, there is still an inexperience factor related to specifics of corporate culture, processes, methodologies and technicalities that are unique of AuCo. Also from this data, only 14% of employees stayed in the organization for more than 7 years, making those employees in the range of 5 to 7 years the focus of attention for retention actions.
Job Rotation

How many times have you had a position change?

N: 195

- Less than a year
- 1 to 3 years
- 4 to 6 years
- 7 to 10 years
- More than 10 years

Figure 17. Job Rotation

Those with less time in the organization are more likely to rotate jobs at least one time while those with 4 years or more in the organization tend to keep the same job. According to the feedback of supervisors and managers, employees with more experience and seniority have higher opportunities of being promoted, and that motivates the employees to stay in the position. Also, from employee feedback, as they gain more experience they are able to better handle the workload, improve their performance and achieve a better work-life balance.
For each time you changed position, were you performing a similar activity to the previous one or was it a completely different activity?

N=116

![Graph showing activity changes over time](image)

**Figure 18. Change of activity.**

In this work, the job rotation I referred to as a way to improve work experience and career development and presumably an incitement for information transfer implies a change that exposes the employee to new activities and corporate processes that challenge the employee to step out of his comfort zone (Campion, M. A., Cheraskin, L., & Stevens, M. J., 1994).

Regarding the participants that have changed positions along their career in AuCo, those who changed within the first 3 years, 45% performed almost the same or very similar tasks of what they were doing in the past. It is until the second and later changes where the new activities are more likely to be completely different from those executed in the past.
How much do you want to change to a different position?

- 7%: I would change immediately.
- 31%: I would change if I'm not sure about a change.
- 35%: I would prefer to wait for a change.
- 14%: I don't want to change.

From the 38% of the employees that responded they would change immediately or they would change if there is an opportunity, 45% reported to be satisfied or very satisfied with their current position and 44% said they were somewhat satisfied. Thus, job rotation seems to be attractive for employees without necessarily be related with the dissatisfaction in their current job. This supports the idea that job rotation can be consider a way to reward and motivate employees without promoting them.

Figure 19. Willingness to change.
Employee collaboration

For your daily work, how often do you approach a colleague for advice?

N=195

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>37%</td>
</tr>
<tr>
<td>Twice a week</td>
<td>32%</td>
</tr>
<tr>
<td>Once a week</td>
<td>22%</td>
</tr>
<tr>
<td>Once a month or less</td>
<td>8%</td>
</tr>
<tr>
<td>Never</td>
<td>2%</td>
</tr>
</tbody>
</table>

Figure 20. Employee Collaboration

When looking for advice, how often you look for:

N=195

- Technical advice: 60%
- Career advice: 50%
- Organizational advice: 40%
- Personal advice: 30%
- Other: 20%

Figure 21. Type of advice distribution
From surveyed employees 91% request advice from a colleague at least one time during the week.

~70% of the times that an employee look for advice from a colleague he is looking for technical advice. This fact is of particular interest for this work inasmuch as the technological gatekeeper concept that I have described is based on the informal transfer of technical knowledge. In addition, this data seems to support the "Readiness to Cooperate" characteristic described in section 2 that supports the relation among communication, technology transfer and innovation.

![Pie chart showing advice search preference](image)

**Figure 22. Advice search preference**

In accordance with the management AuCo has given particular attention to the development of training material and online resources in all the different areas across the organization as support for the employees to execute their tasks. This graph shows that the preference of the participants is to approach a colleague rather than to use the online resources. Certainly this doesn’t disqualify the relevance of online resources but it does suggest that there might be some reasons that prevent employees from used them as a first choice to get answers that help them in the daily execution of tasks.
The communication patterns described by figure 19 and 20 supports the idea that the main source of information (at least for the survey participants) are predominately functional engineers (45%) and supervisors (27%).

**Advisor's characteristics.**

- **He/She is highly experienced, always know the right answer.**
- **He/She is friendly and takes the time to explain in detail.**
- **He/She always knows who else can assist me if he/she doesn’t know the answer.**
- **He/She is a good friend of mine.**
- **I don’t know other people to approach for technical advice.**

**Figure 23. Advisor's area and position in the organization.**

**Figure 24. Advisor's Characteristics**
The employees identified as a source for advice are also seen as approachable, highly experienced and main contact to get to the right person when he/she doesn’t have the answer. These findings are probably the best starting point to look for the employees that might be performing as technological gatekeepers inside the organization, however, the interactions with multiple stakeholders inside and outside the organization must be demonstrated as part of the defining gatekeeper’s characteristics.

**Recognition**

**How often the management encourages you to assist people from other areas?**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always encourages me to assist others</td>
<td>46%</td>
</tr>
<tr>
<td>Encourages me to assist others only when is related to my work</td>
<td>31%</td>
</tr>
<tr>
<td>Encourages me to assist others only from the same area</td>
<td>7%</td>
</tr>
<tr>
<td>Rarely encourages me to assist others</td>
<td>13%</td>
</tr>
<tr>
<td>Never encourages me to assist others</td>
<td>3%</td>
</tr>
</tbody>
</table>

N:195

**Figure 25. Management reinforcement on collaboration.**

AuCo management recognizes that collaboration is an important part of PDP, The management proudly declares that they encourage cross-areas teamwork and interactions, and the findings of the survey support that statement. However, encouraging collaboration might not be enough to
unchain significant effects in the communication process in such way that communication types II and III take place along the PDP.

When you approach others for advice what is their response?

- **40%** He/She assists others actively, even without previous request.
- **35%** He/She always assists others even when busy in his/her own tasks.
- **30%** He/She assists others only when someone request his/her assistance.
- **25%** He/She is always busy and rarely is available for advice.
- **20%** Other

**Figure 26. Attitude towards collaboration.**
How does the company recognize the knowledge and assistance to others?

- It is considered in the annual performance review. 22%
- He/She has some privileges (e.g. Preferred flexible parking space) 38%
- He/She receives monetary incentives (includes amazon gift cards, restaurant discounts, etc.) 10%
- There is no recognition 39%
- I don’t know

*Multiple answers question

Figure 27. Collaboration recognition.

From the data shown in Figure 27, it is verified that informal collaboration is naturally happening and the employees consider it as a common way to communicate and gather information to execute their tasks. In the other side, the management doesn’t consider it as a key activity to be rewarded. There is no well-known recognition for employees that potentially perform as technical experts and are recognized in such way by their peers. These findings drive to conclude that there are few changes that technical gatekeepers have been already noted by the management.
Work–related Interactions

Relationships due to work activities.
N=195

Some of the remarks from the previous data are that from the employees that interact at least 80% of the time with all areas inside and outside the organization (hard blue bar), 16% have 7 or more years of experiences within AuCo; and for those which most of the daily activities involve their internal area and external areas (yellow bar), 11% have ten years of experience or more within the company.
As I described in the company background section, most employees have to interact with both internal and external areas, but few of them have done it for a long period of time (more than 6 years).

*When working with EXTERNAL areas you are more likely to be:

- Getting approval: 55%
- Delivering results: 61%
- Gathering information: 80%
- Keeping others informed: 37%

*Multiple answers question

**Figure 29. External relationship outcome**

The data from figure 29 proves that when work activities require interaction with external sources the predominant purpose of it is to get information from the source.
Self-perception

How would you describe your experience assisting your colleagues from External Areas (suppliers, clients, nonlocal/overseas offices, etc.) to solve their work related problems?

- I'll assist my colleagues from External Areas only if I'm interested in the solution of the problem.
- I'll assist my colleagues from External Areas only if I know the answer, even if I'm not related to the problem.
- I'll assist my colleagues from External Areas only if my manager ask me to do it.
- I prefer not to assist my colleagues from External Areas, they will find out the solution.
- I don't work with colleagues form External Areas.

Figure 30. Willingness to assist outsiders.
How would you describe your experience assisting your colleagues to solve their work related problems?

- I'm always happy to assist my colleagues no matter how busy I am. (15%)
- I assist my colleagues only if I have time. (2%)
- I assist my colleagues only if my manager asks me to do it. (1%)
- I'm always too busy to assist my colleagues. (0%)
- I prefer not to get involved in my colleagues problems. (82%)

Figure 31. Willingness to assist others

The strong willingness to assist others, insiders and outsiders, reveals a cooperation-driven style that opens the opportunity to manage the communication system towards the interchange of ideas and information that can cause a culture of innovation to develop.
In terms of experience, how do you perceive yourself in your current position? 

Figure 32. Self-perceived experience – Seniority in job position.

Figure 33. Self-perceived experience – Seniority in the company
As I have described in section 2, one important characteristic of the technological gatekeeper is the high level of expertise. However, there is no easy way to determine the level of expertise that employees hold within the organization. In general, seniority has been used as the main way to identify more experienced employees, but that approach might not be the best in all cases. As shown by the information in figures 32 and 33, self-perceived experience sometimes differ from the actual time that an employee has been in the company or in the position. Employees that have been in the company for four to ten years can perceive themselves as experienced as those who have been in the company for more than 10 years. From there that the management must pay attention on who are the employees that are usually identified by their peers as a good source of information. It is the feedback from others that can lead the management to accurately identify the specialist or experts that are translating external information into useful solutions for task execution.

Chapter 5 | Conclusion and Recommendations

5.1 Summary of Key Findings

Despite the complex communication structure that results from the combination of AuCo’s organizational architecture and PDP complexity, the PDD division has been able to build a culture of collaboration where employees appeal to their peers as a first option to find technical information for their daily task execution.

The collaboration style of PDD division goes beyond the internal community and expands the scope to include also external parties such as suppliers and other affiliates. This readiness to assist outsiders in combination with the obligated relationship due to work activities, sets the ideal conditions for the technological gatekeeper to emerge. Added to that, the current pattern of a high number of employees (55%) referring to the same person for advice becomes important evidence that there are specific employees perceived by their peers as a source of technical information.
In the other hand, it is clear from the results that the management hasn’t recognized the opportunity that the collaboration style of the organization represents. The conditions to develop a strong communication strategy through collaboration are present but, as with any other strategies, someone needs to take the lead and set up a plan to define what the strategy for implementation looks like, how the identified skills will be used, what are the structural changes that need to be done, who are the key individuals that will need to be involved and what will be the processes and guidelines to regulate it.

The collected information also revealed that, from the Technological Gatekeeper integration model that I presented in section 3.2 (Figure 10), the PDO fails to provide the following inputs in order for the technological gatekeeper to function as a tool for effective communication and technical information transfer:

- Proper Identification
- Regulation
- Motivation/Reward
- Challenges

Finally, the result showed that there is a desire from employees to change without being directly related to their satisfaction in their current position, but there isn’t a planned execution of job rotation.

5.2 Recommendations

Technological Gatekeeper

It has been proven that the conditions for the gatekeeper to emerge are present in the AuCo’s PDD division. The results presented in this work identify a selected group that has some of the characteristics that define the technological gatekeeper. In order to determine with confidence who the technological gatekeepers are, further participation of the lower and middle management
will be necessary to evaluate the rest of the characteristics that I have provided in Table 1. Due to the self-perception discrepancy that has been demonstrated, it is imperative that such grading come from a third party and not from a self-evaluation. This assessment can be easily integrated into the annual performance review processes as part of the peer-to-peer evaluation that is already in place.

**Communication, Technology Transfer and Innovation**

The promotion of collaboration proved insufficient to foster innovation. AuCo's management must take advantage of the current collaboration style in its PDD area and use it to integrate innovation as part of their culture.

In order to create a competitive advantage based on innovation, AuCo should consider adding appropriate actions and make them part of the current PDP.

Suggested actions based on this work:

- Integrate the technological gatekeeper characteristics list as a tool for the management to effectively identify sources of relevant information coming from the outside.
- Create a training plan for those who have been identified as technological gatekeepers to learn about innovation methods and techniques.
- Implement a reward system that keeps employees interested in the communication of ideas and challenge them to step out of their comfort zone.
- Develop a job rotation plan that allows experienced employees to share their knowledge with different teams across the PDO.
- Create verification controls that help the management evaluate the success of the collaboration.
Leadership

It is essential that those leading at all levels across the PDO have a deep understanding of who the talented people are as professionals, but even more important as persons. *(Leadership: The Missing Link Lectures, Fall 2014)*. Tools such as the MBTI test should be incorporated as part of the general training for all employees paying particular attention to those identified as technological gatekeepers and to the employees in lower and middle level management positions.

Leading teams in a complex PDO as AuCo is not an easy task. From there, that the management should pay particular attention to the positive outcomes of the analysis:

- Colleagues are considered the first source of information.
- Slightly more than half of the surveyed employees trust and reach a particular person for technical advice.
- There is a remarkable disposition to assist others.

Finally, it is important that the management is aware of the inconsistency that might exist between the level of expertise perceived by them, the employee and the real one.

I should emphasize that these recommendations do not have the purpose to control collaboration or communication. It is the nature of the interactions that opens the opportunity to improve the communication and collaboration systems. These are recommendations that help to identify key elements within the system that can function as facilitators of communication and innovation improvement.
5.3 Future Work

Given the constraint derived from the anonymity of the survey, it would be beneficial to perform a more detailed internal survey where information such as names, type of information, and official level of expertise (maybe related to salary) can be collected.

As the management is in charge of the execution of follow up actions, it is prudent to consider the design of a survey that will help to understand the point of view of the lower and middle management employees’ in respect to the collaboration style, the rewarding of technical experts and innovation culture.

Finally, a strategy plan that considers all areas with PDD division should be formalized to ensure that the strategy is embraced by all of those leading the teams.
Bibliography

- Olivier de Weck, *System Project Management*. MIT Lectures, Fall 2013
APPENDIX A

Characteristics for Technical Progressiveness

<table>
<thead>
<tr>
<th>Characteristics for Technical Progressiveness (Carter &amp; Williams, 1959)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Good information sources.</td>
</tr>
<tr>
<td>3. No secretiveness.</td>
</tr>
<tr>
<td>5. Good coordination.</td>
</tr>
<tr>
<td>8. Quantified investment decisions.</td>
</tr>
</tbody>
</table>

Table 2. Characteristics for Technical Progressiveness
Dear "Company Name" Product Development Employees,

I'm writing to ask for your help to answer the following 10 min survey:

http://www.surveymonkey.com/create/survey/preview?r=true&sm=GzQvd_2By9FLWMIJVWQPPH9JuPY1o
mTOF42xBQJk3XQyJ82HrvWdc7_28qQ0p60_2FUcU

I'm a graduate student in the System Design and Management Program at the Massachusetts Institute of Technology (MIT). As part of my thesis work I'm gathering data that will help me better understand the informal networking systems inside product development organizations.

Your response to this survey is very important and greatly appreciated.

Thank you very much for your time and attention.

Please feel free to contact me for any comment or question.

Sincerely,

Aihelv Almazan
System Design and Management Fellow
alhely@mit.edu
Identifying the Gatekeepers inside the organization.

Please answer honestly the following questions, this survey is completely anonymous.

1. For how long have you been part of the organization (Mexico)?
   a) Less than a year
   b) 1 to 3 years
   c) 4 to 6 years
   d) 7 to 10 years
   e) More than 10 years

2. Which is your current position and area (e.g. Door Panels Design&Release Engineer, Body Exterior)?

3. For how long have you been in the current position?
   a) Less than a year
   b) 1 to 3 years
   c) 4 to 6 years
   d) 7 to 10 years
   e) More than 10 years

4. During your time in the organization, how many times have you had a position change? (i.e. A change to a different area, commodity and/or location.)
   a) I have had always the same position
   b) I have changed once
   c) I have changed twice
   d) I have changed more than two times
   e) I left the company for certain time but came back.

5. For each time you changed position, were you performing a similar activity to the previous one or was it a completely different activity?

<table>
<thead>
<tr>
<th></th>
<th>Almost same activity</th>
<th>Very related to the previous one</th>
<th>Somehow different activity</th>
<th>Different Activity</th>
<th>Completely different activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 1st time change</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b) 2nd time change</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c) 3rd time change</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d) 4th time change</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e) 5th time change</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
6. For your daily work, how often do you approach a colleague for advice?
   a) Daily
   b) Twice a week
   c) Once a week
   d) Once a month or less
   e) Never

7. When looking for advice, how often you look for (Please answer for all options):

<table>
<thead>
<tr>
<th>Always</th>
<th>Very Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
</table>
   a) Technical advice | 1 | 2 | 3 | 4 | 5 |
   b) Career advice | 1 | 2 | 3 | 4 | 5 |
   c) Organizational advice | 1 | 2 | 3 | 4 | 5 |
   d) Personal advice | 1 | 2 | 3 | 4 | 5 |
   e) Other | 1 | 2 | 3 | 4 | 5 |

8. When looking for advice, do you always approach the same person?
   a) Yes, always
   b) Most of the times
   c) No, I always ask to different persons
   d) I never ask for advice, I use resources online instead.
   e) I never ask for advice, I figure out the answer myself.

9. If you answered a) YES or b) MOST OF THE TIMES to previous question, please tell us the area (BI-Body Interior, BE-Body Exterior, DI, VEV-Vehicle Evaluation&Validation, Chassis, Powertrain, F&P-Finance & Purchasing, etc.) and position (Director, Chief Engineer, Manager, Supervisor, Engineer, etc.) in the organization of that person:

<table>
<thead>
<tr>
<th>BI</th>
<th>BE</th>
<th>DI</th>
<th>VEV</th>
<th>Chassis</th>
<th>Powertrain</th>
<th>F&amp;P</th>
<th>Other</th>
</tr>
</thead>
</table>
   a) Director | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
   b) Manager | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
   c) Supervisor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
   d) Engineer | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
   e) Other | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
10. What are the reasons you approach this person for advice? Check all the options that apply.
   a) He/She is highly experienced, always know the right answer.
   b) He/She is friendly and takes the time to explain in detail.
   c) He/She always knows who else can assist me if he/she doesn’t know the answer.
   d) He/She is a good friend of mine.
   e) I don’t know other people to approach for technical advice.

11. When you approach others for advice what is the response?
   a) He/She assists others actively, even without previous request.
   b) He/She always assists others even when busy in his/her own tasks.
   c) He/She assists others only when someone request his/her assistance.
   d) He/She is always busy and rarely is available for advice.
   e) Other

12. How does the company recognize the knowledge and assistance to others of the person mentioned above? Check all the options that apply.
   a) It is considered in the annual performance review.
   b) He/She has some privileges (e.g. Preferred flexible parking space)
   c) He/She receives monetary incentives (includes amazon gift cards, restaurant discounts, etc.)
   d) There is no recognition
   e) I don’t know

13. For your current position you mostly work with:
   a) My area only
   b) My area and internal local (Mexico) areas (engineering, finance, manufacturing, etc.)
   c) My area and external areas (suppliers, clients, non-local/overseas offices, etc.)
   d) Only external areas (suppliers, clients, non-local/overseas offices, etc.)
   e) All of them: my area, internal and external areas.

14. How often do you work with EXTERNAL areas (suppliers, clients, non-local/overseas offices):
   Always   Very Often   Sometimes   Rarely   Never
15. When working with EXTERNAL areas you are more likely to be:
   a) Getting approval.
   b) Gathering information.
   c) Keeping others informed.
   d) Delivering results.
   e) Other __________________

16. In term of experience, how do you perceive yourself in your current position?

<table>
<thead>
<tr>
<th>Level</th>
<th>Little experienced</th>
<th>Somehow experienced</th>
<th>Fairly Experienced</th>
<th>Experienced</th>
<th>Very experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

17. In your opinion, how does your supervisor would rate you in terms of experience:

<table>
<thead>
<tr>
<th>Level</th>
<th>Little experienced</th>
<th>Somehow experienced</th>
<th>Fairly Experienced</th>
<th>Experienced</th>
<th>Very experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

18. How often the management encourages you to assist people from other areas?

   a) Always encourages me to assist others.
   b) Encourages me to assist others only when is related to my work.
   c) Encourages me to assist others only from the same area.
   d) Rarely encourages me to assist others.
   e) Never encourages me to assist others.

19. How would you describe your experience assisting your colleagues to solve their work related problems?

   a) I’m always happy to assist my colleagues no matter how busy I am.
   b) I assist my colleagues only if I have time.
   c) I assist my colleagues only if my manager asks me to do it.
   d) I’m always too busy to assist my colleagues.
e) I prefer not to get involved in my colleagues' problems.

20. How would you describe your experience assisting your colleagues from External Areas (suppliers, clients, non-local/overseas offices, etc.) to solve their work-related problems?
   a) I'll assist my colleagues from External Areas only if I'm interested in the solution of the problem.
   b) I'll assist my colleagues from External Areas only if I know the answer, even if I'm not related to the problem.
   c) I'll assist my colleagues from External Areas only if my manager asks me to do it.
   d) I prefer not to assist my colleagues from External Areas, they will find out the solution.
   e) I don't work with colleagues from External Areas.

21. Please rate yourself on how satisfied you are about your current position:

<table>
<thead>
<tr>
<th>Completely Dissatisfied</th>
<th>Dissatisfied</th>
<th>Somehow Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>I'm desperately looking for a change</td>
<td>My current position is ok</td>
<td>I love my current position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

22. Please add any other comment that you think will be relevant for us in order to understand better the communication process inside product development organizations.

_________________________________________________________________________________________________________________________________________

_________________________________________________________________________________________________________________________________________

Your Name (Optional): __________________________________________________________

THANK YOU!
APPENDIX C
Survey Answers

Q1: For how long have you been part of the organization (Mexico)?
Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Less than a year</td>
<td>12.82%</td>
</tr>
<tr>
<td>b) 1 to 3 years</td>
<td>49.74%</td>
</tr>
<tr>
<td>c) 4 to 6 years</td>
<td>23.59%</td>
</tr>
<tr>
<td>d) 7 to 10 years</td>
<td>3.08%</td>
</tr>
<tr>
<td>e) More than 10 years</td>
<td>10.77%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

Gatekeepers Survey

Q2 Which is your current position and area (e.g. Door Panels Design&Release Engineer, Body Exterior)?
Answered: 195  Skipped: 0
Q3: For how long have you been in the current position?

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Less than a year</td>
<td>29.23%</td>
</tr>
<tr>
<td>b) 1 to 3 years</td>
<td>52.31%</td>
</tr>
<tr>
<td>c) 4 to 6 years</td>
<td>15.38%</td>
</tr>
<tr>
<td>d) 7 to 10 years</td>
<td>2.05%</td>
</tr>
<tr>
<td>e) More than 10 years</td>
<td>1.03%</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
</tr>
</tbody>
</table>

Q4: During your time in the organization, how many times have you had a position change? (I.e. A change to a different area, commodity and/or location.)

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I have had always the same position</td>
<td>40.51%</td>
</tr>
<tr>
<td>b) I have changed once</td>
<td>30.26%</td>
</tr>
<tr>
<td>c) I have changed twice</td>
<td>11.79%</td>
</tr>
<tr>
<td>d) I have changed more than two times</td>
<td>17.64%</td>
</tr>
<tr>
<td>e) I left the company for certain time but came back</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
</tr>
</tbody>
</table>
Q5: For each time you changed position, were you performing a similar activity to the previous one or was it a completely different activity?

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th></th>
<th>Almost same activity</th>
<th>Very related to the previous one</th>
<th>Somehow different activity</th>
<th>Different activity</th>
<th>Completely different activity</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 1st time change</td>
<td>44.62%</td>
<td>18.46%</td>
<td>13.33%</td>
<td>16.77%</td>
<td>12.82%</td>
<td>87</td>
<td>2.29</td>
</tr>
<tr>
<td>b) 2nd time change</td>
<td>29.33%</td>
<td>21.33%</td>
<td>16.80%</td>
<td>18.67%</td>
<td>14.67%</td>
<td>22</td>
<td>2.68</td>
</tr>
<tr>
<td>c) 3rd time change</td>
<td>43.14%</td>
<td>15.89%</td>
<td>7.84%</td>
<td>15.69%</td>
<td>17.65%</td>
<td>22</td>
<td>2.49</td>
</tr>
<tr>
<td>d) 4th time change</td>
<td>40.54%</td>
<td>5.41%</td>
<td>27.03%</td>
<td>13.51%</td>
<td>13.51%</td>
<td>15</td>
<td>2.54</td>
</tr>
<tr>
<td>e) 5th time change</td>
<td>48.39%</td>
<td>9.68%</td>
<td>6.45%</td>
<td>9.68%</td>
<td>25.81%</td>
<td>15</td>
<td>2.55</td>
</tr>
</tbody>
</table>

Q6: For your daily work, how often do you approach a colleague for advice?

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Daily</td>
<td>36.92%</td>
</tr>
<tr>
<td>b) Twice a week</td>
<td>32.31%</td>
</tr>
<tr>
<td>c) Once a week</td>
<td>21.54%</td>
</tr>
<tr>
<td>d) Once a month or less</td>
<td>7.69%</td>
</tr>
<tr>
<td>e) Never</td>
<td>1.54%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>195</strong></td>
</tr>
</tbody>
</table>
Q7: When looking for advice, how often you look for: Please answer for all options.

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Very Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Technical advice</td>
<td>15.98%</td>
<td>53.89%</td>
<td>24.74%</td>
<td>5.67%</td>
<td>0.52%</td>
<td>194</td>
</tr>
<tr>
<td>b) Career advice</td>
<td>1.61%</td>
<td>5.38%</td>
<td>38.71%</td>
<td>43.01%</td>
<td>11.29%</td>
<td>186</td>
</tr>
<tr>
<td>c) Organizational advice</td>
<td>2.13%</td>
<td>12.77%</td>
<td>39.89%</td>
<td>38.30%</td>
<td>6.91%</td>
<td>188</td>
</tr>
<tr>
<td>d) Personal advice</td>
<td>3.78%</td>
<td>4.32%</td>
<td>25.95%</td>
<td>41.62%</td>
<td>24.32%</td>
<td>185</td>
</tr>
<tr>
<td>e) Other</td>
<td>1.20%</td>
<td>8.43%</td>
<td>9.64%</td>
<td>7.23%</td>
<td>73.49%</td>
<td>83</td>
</tr>
</tbody>
</table>

Q8: When looking for advice, do you always approach the same person?

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Yes, always</td>
<td>0.51%</td>
</tr>
<tr>
<td>b) Most of the times</td>
<td>54.87%</td>
</tr>
<tr>
<td>c) No, I always ask to different persons</td>
<td>44.10%</td>
</tr>
<tr>
<td>d) I never ask for advice, I use resources online instead.</td>
<td>0.00%</td>
</tr>
<tr>
<td>e) I never ask for advice, I figure out the answer myself.</td>
<td>0.51%</td>
</tr>
</tbody>
</table>

Total                                      | 195       |
Q9: If you answered a) or b) options to previous question, please tell us the area and position in the organization of that person:

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Area</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI-Body Interior</td>
<td>0.00%</td>
</tr>
<tr>
<td>BE-Body Exterior</td>
<td>9.09%</td>
</tr>
<tr>
<td>Design-Digital Innovation</td>
<td>6.06%</td>
</tr>
<tr>
<td>VEV-Vehicle Evaluation &amp; Verification</td>
<td>2.03%</td>
</tr>
<tr>
<td>Powertrain</td>
<td>6.86%</td>
</tr>
<tr>
<td>F&amp;P-Finance &amp; Purchasing</td>
<td>0.00%</td>
</tr>
<tr>
<td>Other</td>
<td>69.78%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Q10: What are the reasons you approach this person for advice?
Check all the options that apply.

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) He/She is highly experienced, always know the right answer.</td>
<td>66.15% 129</td>
</tr>
<tr>
<td>b) He/She is friendly and takes the time to explain in detail.</td>
<td>65.64% 128</td>
</tr>
<tr>
<td>c) He/She always knows who else can assist me if he/she doesn’t know the answer.</td>
<td>54.87% 107</td>
</tr>
<tr>
<td>d) He/She is a good friend of mine</td>
<td>27.18% 53</td>
</tr>
<tr>
<td>e) I don’t know other people to approach for technical advice.</td>
<td>2.56% 5</td>
</tr>
</tbody>
</table>

Total Respondents: 195
Q11: When you approach others for advice what is their response?
Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) He/She assists others actively, even without previous request.</td>
<td>30.77%</td>
</tr>
<tr>
<td>b) He/She always assists others even when busy in his/her own tasks.</td>
<td>33.85%</td>
</tr>
<tr>
<td>c) He/She assists others only when someone request his/her assistance.</td>
<td>29.74%</td>
</tr>
<tr>
<td>d) He/She is always busy and rarely is available for advice.</td>
<td>4.10%</td>
</tr>
<tr>
<td>e) Other (please specify)</td>
<td>1.64%</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
</tr>
</tbody>
</table>

Q12: How does the company recognize the knowledge and assistance to others of the person mentioned above? Check all the options that apply.
Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) It is considered in the annual performance review.</td>
<td>21.54%</td>
</tr>
<tr>
<td>b) He/She has some privileges (e.g. Preferred parking space)</td>
<td>1.03%</td>
</tr>
<tr>
<td>c) He/She receives monetary incentives (includes Amazon gift cards, restaurant discounts, etc.)</td>
<td>9.74%</td>
</tr>
<tr>
<td>d) There is no recognition</td>
<td>39.49%</td>
</tr>
<tr>
<td>e) I don’t know</td>
<td>38.46%</td>
</tr>
<tr>
<td>Total Respondents: 195</td>
<td></td>
</tr>
</tbody>
</table>
Q13: For your current position you mostly work with:

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) My area only</td>
<td>3.08% 6</td>
</tr>
<tr>
<td>b) My area and internal local (Mexico) areas (engineering, finance, manufacturing, etc.)</td>
<td>18.46% 36</td>
</tr>
<tr>
<td>c) My area and external areas (suppliers, clients, non-local/overseas offices, etc.)</td>
<td>32.82% 64</td>
</tr>
<tr>
<td>d) Only external areas (suppliers, clients, non-local/overseas offices, etc.)</td>
<td>2.05% 4</td>
</tr>
<tr>
<td>e) All of them: my area, internal and external areas.</td>
<td>43.59% 85</td>
</tr>
</tbody>
</table>

Total 195

Q14: How often do you work with EXTERNAL areas (suppliers, clients, non-local/overseas offices)?

Answered: 195  Skipped: 0

| Always Very Often Sometimes Rarely Never Total Weighted Average |
|-------------------|-------------------|------------------|----------------|----------|----------|----------------|
| (no label)        | 35.38%            | 32.31%           | 18.46%         | 11.78%   | 2.56%    | 195 3.87       |
Q15: When working with EXTERNAL areas you are more likely to be: Check all the options that apply.

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Getting approval.</td>
<td>36.92%</td>
</tr>
<tr>
<td>b) Gathering information.</td>
<td>80.00%</td>
</tr>
<tr>
<td>c) Keeping others informed.</td>
<td>54.87%</td>
</tr>
<tr>
<td>e) Delivering final results.</td>
<td>61.03%</td>
</tr>
<tr>
<td>e) Other (please specify)</td>
<td>12.82%</td>
</tr>
</tbody>
</table>

Total Respondents: 195

Q16: In term of experience, how do you perceive yourself in your current position?

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>L Little experienced</th>
<th>Somehow experienced</th>
<th>Fairly experienced</th>
<th>Experienced</th>
<th>Very experienced</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no label)</td>
<td>4.62%</td>
<td>19.49%</td>
<td>33.85%</td>
<td>33.33%</td>
<td>8.72%</td>
<td>1.32</td>
</tr>
<tr>
<td>9</td>
<td>38</td>
<td>68</td>
<td>65</td>
<td>17</td>
<td>195</td>
<td></td>
</tr>
</tbody>
</table>
Q17: In your opinion, how does your supervisor rate you in terms of experience?
Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Experience Level</th>
<th>Number</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little experienced (no label)</td>
<td>10</td>
<td>5.13%</td>
</tr>
<tr>
<td>Somehow experienced</td>
<td>45</td>
<td>23.08%</td>
</tr>
<tr>
<td>Fairly experienced</td>
<td>56</td>
<td>28.72%</td>
</tr>
<tr>
<td>Experienced</td>
<td>67</td>
<td>34.36%</td>
</tr>
<tr>
<td>Very experienced</td>
<td>17</td>
<td>8.72%</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
<td>3.18%</td>
</tr>
</tbody>
</table>

Q18: How often does the management encourage you to assist people from other areas?
Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Always encourages me to assist others.</td>
<td>45.64%</td>
</tr>
<tr>
<td>b) Encourages me to assist others only when related to my work.</td>
<td>30.77%</td>
</tr>
<tr>
<td>c) Encourages me to assist others only from the same area.</td>
<td>7.18%</td>
</tr>
<tr>
<td>d) Rarely encourages me to assist others.</td>
<td>13.33%</td>
</tr>
<tr>
<td>e) Never encourages me to assist others.</td>
<td>3.00%</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
</tr>
</tbody>
</table>
Q19: How would you describe your experience assisting your colleagues to solve their work related problems?

Answered: 195   Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I'm always happy to assist my colleagues no matter how busy I am.</td>
<td>82.05%</td>
</tr>
<tr>
<td>b) I assist my colleagues only if I have time.</td>
<td>15.38%</td>
</tr>
<tr>
<td>c) I assist my colleagues only if my manager asks me to do it.</td>
<td>2.05%</td>
</tr>
<tr>
<td>d) I'm always too busy to assist my colleagues.</td>
<td>0.51%</td>
</tr>
<tr>
<td>e) I prefer not to get involved in my colleagues problems.</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>195</td>
</tr>
</tbody>
</table>

Q20: How would you describe your experience assisting your colleagues from External Areas (suppliers, clients, non-local/overseas offices, etc.) to solve their work related problems?

Answered: 195   Skipped: 0

<table>
<thead>
<tr>
<th>Answer Choices</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I'll assist my colleagues from External Areas only if I'm interested in the solution of the problem.</td>
<td>22.05% 43</td>
</tr>
<tr>
<td>b) I'll assist my colleagues from External Areas only if I know the answer, even if I'm not related to the problem.</td>
<td>65.13% 127</td>
</tr>
<tr>
<td>c) I'll assist my colleagues from External Areas only if my manager ask me to do it.</td>
<td>5.64% 11</td>
</tr>
<tr>
<td>d) I prefer not to assist my colleagues from External Areas, they will find out the solution.</td>
<td>6.51% 1</td>
</tr>
<tr>
<td>e) I don't work with colleagues form External Areas.</td>
<td>6.67% 13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>195</td>
</tr>
</tbody>
</table>
Q21: Please rate yourself on how satisfied you are about your current position:

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th></th>
<th>Completely Dissatisfied</th>
<th>Dissatisfied</th>
<th>Somehow Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no label)</td>
<td>1.54%</td>
<td>3.08%</td>
<td>23.08%</td>
<td>48.72%</td>
<td>23.59%</td>
<td>195</td>
<td>3.90</td>
</tr>
</tbody>
</table>

Q22: How much do you want to change to a different position?

Answered: 195  Skipped: 0

<table>
<thead>
<tr>
<th></th>
<th>I would change immediately.</th>
<th>I would change if I can.</th>
<th>I'm not sure about a change.</th>
<th>I would prefer to wait for a change.</th>
<th>I don't want to change.</th>
<th>Total</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no label)</td>
<td>7.18%</td>
<td>31.28%</td>
<td>12.31%</td>
<td>34.87%</td>
<td>14.36%</td>
<td>195</td>
<td>3.18</td>
</tr>
</tbody>
</table>