

## **Influential Article Review - The History of FMC Technologies: A Transitional Matrix**

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*This paper examines innovation. We present insights from a highly influential paper. Here are the highlights from this paper: The matrix structure is sometimes presented as an inevitable “end point” for organizations that must adapt to an increasingly complex business environment. However, observations of the structure of firms do not always confirm this view. The paper describes the evolution of FMC Subsea, a large division of the global technology firm FMC Technologies (now TechnipFMC). During the 2001–2016 time period, the firm’s organizational structure underwent three significant changes. The firm was originally organized by geography. In 2011, it introduced global product units, which resulted in dual reporting lines (i.e., a matrix structure) for some regional managers. However, in 2015, it separated the product lines from the regional units, thereby eliminating the need for dual reporting. This example suggests that the matrix structure may sometimes be a transitory form that eventually gives way to a simpler—yet still multidimensional—structure. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.*

*Keywords: Multinational firms, Matrix structures, Multidimensional organizational models, Complexity, Simplification*

### **SUMMARY**

- The evolution of FMC Subsea during the 2001–2016 period illustrates that new organizational models are adopted to align the organization with new strategic priorities and also to correct for deficiencies in the current model. The initial challenge was to establish an organization that could serve international markets and adapt to local and regional customer requirements. Consequently, a regional structure was chosen. Another key priority was to balance the need to meet customer-specific requirements in projects with the ability to leverage common components and methods across projects. The solution, product teams, was conceived of in 1996 and remained a key element in all of the subsequent variations of the organizational model. When the second major change was initiated in 2011, the key challenge was to improve cost effectiveness and competitiveness. The lack of coordination and standardization across regions was seen as a key obstacle, and was addressed by consolidating activities and establishing new global units. Finally, in 2015, the need for cost effectiveness increased even further, as a result of the industry downturn. One can imagine

that it was easier to get acceptance among the existing regional managers for a model that simply added a reporting line, compared to the alternative, which might have been interpreted as a «loss» of key resources and/or a reduced scope of responsibility for the regional managers. After 4 years, however, when it was clear that the matrix structure was a challenging model, the required consensus had emerged for going all the way and removing the product teams from the regional structure and transferring them to a global unit.

- Another possible explanation is that the successful implementation of a new organizational model requires a certain maturity level. A new organizational model is not only a formal reporting structure, but also requires the re-definition of unit level goals and key performance indicators and adjustments in terms of individual roles and working relationships. One may speculate that the matrix structure that was introduced in 2011 provided a rather modest change from the pre-existing model, yet provided some benefits in terms of increasing coordination and knowledge sharing across the four regions. The experience from working in the matrix may then have conferred both individual and organizational learning that enabled the organization to take the next step and successfully adopt the organizational model that was introduced in 2015.
- In the previous model, implemented in 2011, the team leaders within the geographical product lines reported to one manager in the regional unit and to another manager in the global product lines. The global product lines were accountable for enhancing standardization across regions, while the regional product units were accountable for ensuring delivery of components/modules at the request of the EPC projects. One senior executive stated: «People found it difficult having to ask one manager about what they should do, and another about when they should do it.» The argument that the 2015 model leads to simplification rests on a key assumption: that one is able to implement the model as intended. One potential risk with this type of change is that the formal matrix simply becomes a «hidden matrix» that is equally hard to operate. This may happen if roles and responsibilities overlap at the sub-unit level. As mentioned above, the product delivery teams represent the linkage between the global and the regional organization as they formally report to a leader at the global level yet deliver components to projects organized regionally. It is likely that there will be situations where it is necessary to make trade-offs, for example, between fully satisfying customer requirements in a project versus reaching cost reduction targets. However, based on my interviews, it seemed like FMC Subsea placed considerable emphasis on defining the sub-unit mandates and the resource model.

## HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

Worren, N. (2017). The matrix as a transitory form: the evolution of FMC technologies 2001–2016. *Journal of Organization Design*, 6(1), 1–14.

This is the link to the publisher's website:

<https://jorgdesign.springeropen.com/articles/10.1186/s41469-017-0023-0>

## INTRODUCTION

According to one consulting firm, 95% of Fortune top 50 and 90% of FTSE top 50 companies have adopted the matrix structure (Thompson 2013). In the academic literature, the key assumption is that the matrix, as a complex organizational form, is a response to an ever more complex business environment:

“An increase in environmental complexity and uncertainty drives the need for the matrix and its complexity. The introduction of a matrix structure thus follows the Law of Requisite Variety (Ashby 1956): Complexity in the environment must be matched with complexity in the organization's design” (Burton et al. 2015, p. 37)

International firms, in particular, face a complex business environment. They need to balance pressures for adaptation to local customer requirements with pressures for global integration, manage cultural differences, and handle differences in regulatory regimes across the countries in which they operate. Indeed, the literature on international management posits that while firms in the early stages of internationalization may adopt a product or geographical structure, they will eventually switch to the matrix when they become global—or “transnational”—firms (Bartlett and Ghoshal 2000; Stopford and Wells 1972).

Despite the ubiquity of the concept, there are few systematic studies that can confirm these assumptions. What we know from the few studies that have been conducted is that the adoption rate is far lower than the 95% figure cited above, at least when considering firms outside the USA and the UK. For example, in a study conducted among 82 German multinationals, only 42 of the firms were categorized as having a matrix structure (Wolf and Egelhoff 2013). However, even this figure may be too high, because it was based on a very broad definition of “matrix”: Only 15 out of the 82 firms had the typical matrix structure associated with international firms, where a regional manager reports to both a global product manager and to the head of a regional unit. In an unpublished study performed by a consulting firm in Norway, only 2 out of 16 large international firms were characterized as having a matrix structure, and for the two cases that were identified, only a small subset of managers were “in the matrix,” that is, only a subset of managers reported to two or more bosses (Deloitte 2013).

Scholars have also begun to question the validity of Ashby’s Law of Requisite Variety, referred to above (Poulis and Poulis 2016). A key limitation of Ashby’s law is that it fails to distinguish between necessary complexity (i.e., internal complexity required to adapt to a complex external environment) and unnecessary complexity (e.g., internal complexity caused by suboptimal organization design decisions) (Worren 2012). We know from the practitioner literature that many firms have been attempting to simplify their internal structures, even though the business environment does not show any sign of becoming less complex (Ashkenas 2007).

Hence, the question I raise in this paper is whether it is necessarily true that organizations in complex business environments gravitate toward the matrix form. Since organizational structures evolve over time, I discuss how the structure of one particular organization has evolved in the 15-year period from 2001 to 2016. The organization that I use as a case is a division of the global technology firm FMC Technologies (now TechnipFMC). I describe the organizational model adopted by this firm at the start of the period, in 2001, and discuss why it was adjusted in 2011 and again in 2015. The case illustrates how the organizational model of a complex firm is re-designed in response to internal and external changes. It also shows how the matrix structure may be simplified by introducing an alternative (multidimensional) model that does not require a dual reporting structure.

## CONCLUSION

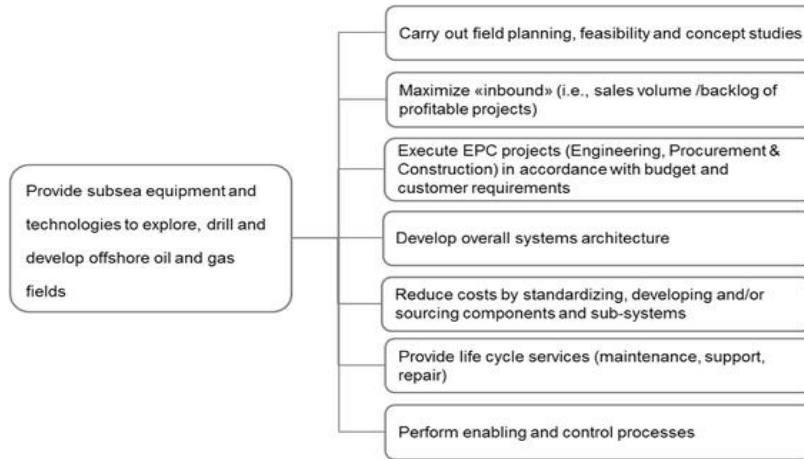
The evolution of FMC Subsea in the 2001–2016 time period shows that the matrix is not an inevitable “end state” for firms that face complex business environments. Instead, it may be a transitory form as firms evolve from a purely geographical (or product based) structure into a multidimensional structure.

Research has shown that many firms that adopt the matrix later abandon it (Burns and Wholey 1993). Early writers such as Davis and Lawrence (1978) anticipated that some organizations that adopted the matrix would find it to be an unworkable design and would return to an earlier structure. However, they did not anticipate the ability of managers to further improve the design. Their assumption was that firms that abandoned the matrix would revert back to a functional structure (p. 226), instead of designing simpler models that can fulfill the same functions as the matrix but at a lower cost due to lower complexity (Ackoff 1999; Worren 2012).

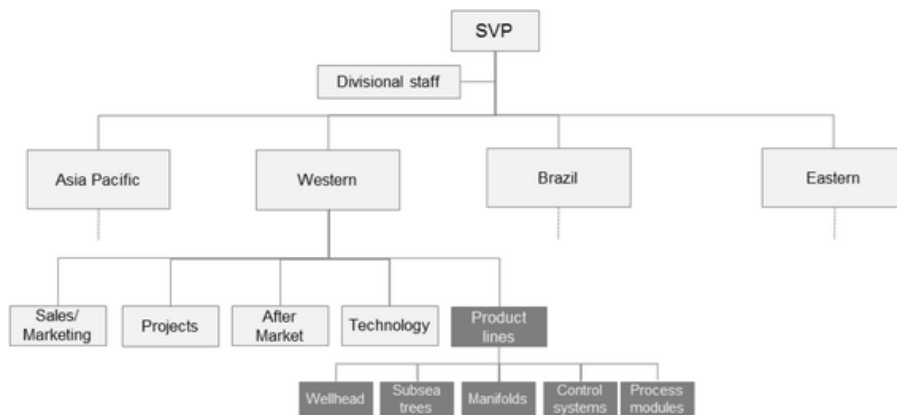
The case described here suggests an alternative option for managers who consider abandoning the matrix and returning to a unidimensional structure. By maintaining the multidimensional structure, but removing the dual reporting relationships, and introducing internal customer-supplier linkages between internal units, one may get some of the benefits of the matrix—but without the costs.

**APPENDIX**

**FIGURE 1  
FMC SUBSEA'S MISSION AND KEY FUNCTIONS**

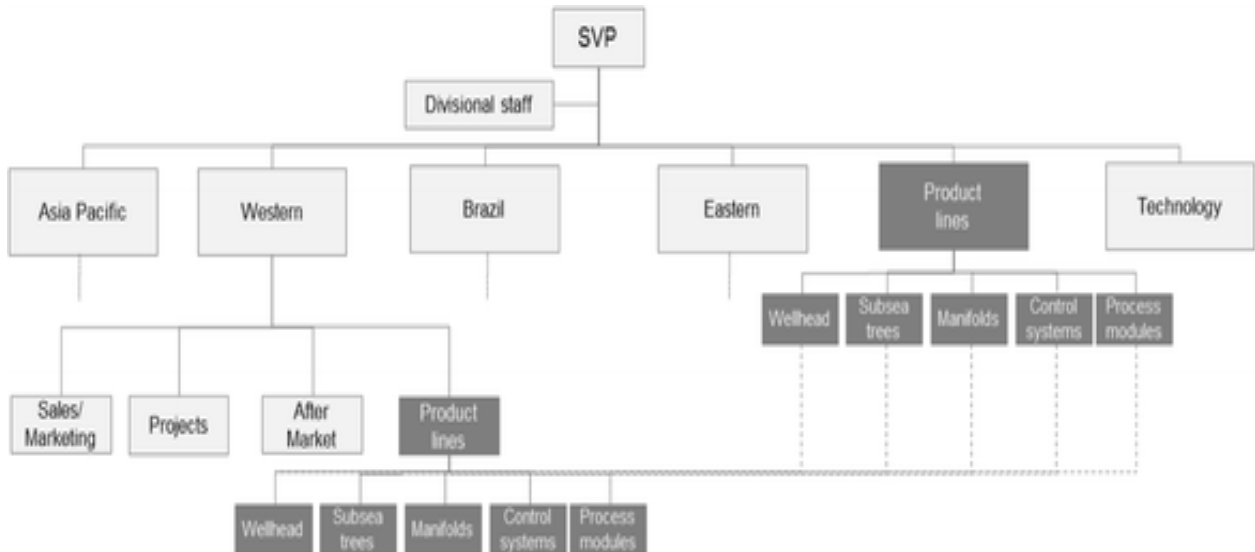


**FIGURE 2  
FMC'S REGIONAL STRUCTURE ADOPTED IN 2001**

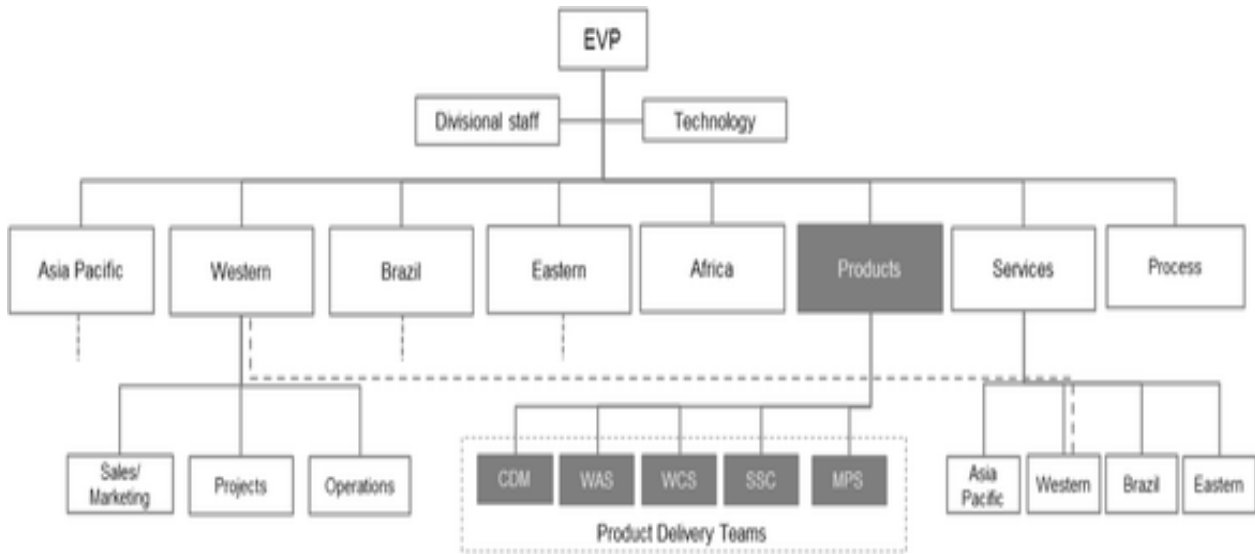


The product lines unit has been highlighted; compare with its placement in the organizational charts shown in Figs. 3 and 4

**FIGURE 3**  
**FMC'S PRODUCT-GEOGRAPHY MATRIX, ADOPTED IN 2011**

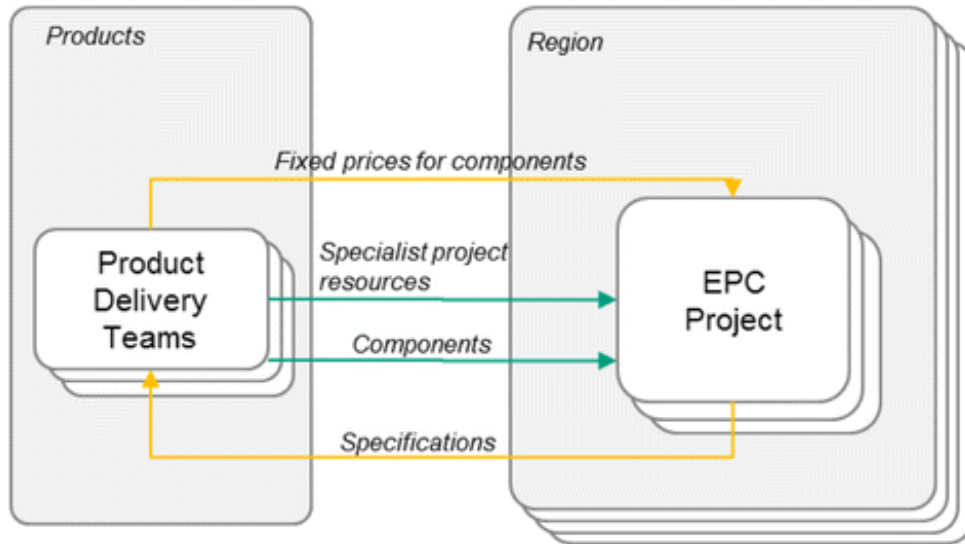


**FIGURE 4**  
**FMC'S REVISED ORGANIZATIONAL MODEL, ADOPTED IN 2015**



(The abbreviations for the product delivery teams stand for CDM = control and data management; WAS = well access systems; MPS = manifold pipeline systems; SSC = subsea core components; WCS = well completion systems.)

**FIGURE 5**  
**KEY INTERDEPENDENCIES BETWEEN PRODUCT DELIVERY TEAMS AND THE EPC (ENGINEERING, PROCUREMENT, AND CONSTRUCTION) PROJECTS**



**TABLE 1**  
**ALLOCATION OF ACCOUNTABILITIES IN THE 2001 ORGANIZATIONAL MODEL**

Functions	Organizational units					
	Regional level					Global level
	Sales/marketing	Projects/engineering	Product lines	Technology	After market	Divisional staff
Carry out field planning, feasibility, and concept studies		●				
Maximize "inbound" (i.e., sales volume/backlog of profitable projects)	●					
Execute EPC projects in accordance with budget and customer requirements		●				
Reduce costs by standardizing, developing, and/or sourcing components and sub-systems			●			
Develop new technologies				●		
Provide life cycle services (maintenance, support, repair)					●	
Perform enabling and control processes						●

EPC engineering, procurement, and construction

**TABLE 2**  
**ALLOCATION OF ACCOUNTABILITIES IN THE 2011 ORGANIZATIONAL MODEL**

Functions	Organizational units						
	Regional level				Global level		
	Sales and marketing	Projects	After market	Product lines	Product lines	Technology	Divisional staff
Carry out field planning, feasibility, and concept studies		●					
Maximize "inbound" (i.e., sales volume/backlog of profitable projects)	●						
Execute EPC projects in accordance with budget and customer requirements		●		●			
Reduce costs by standardizing, developing, and/or sourcing components and sub-systems				●	●		
Develop new technologies						●	
Provide life cycle services (maintenance, support, repair)		●					
Perform enabling and control processes							●

EPC engineering, procurement, and construction

**TABLE 3**  
**ALLOCATION OF ACCOUNTABILITIES IN THE 2015 ORGANIZATIONAL MODEL**

Functions	Organizational units								
	Regional level			Global level					
	Sales and marketing	Projects	Operations	Products	Technology	Services	Process	Divisional staff	Forsys [external]
Carry out field planning, feasibility, and concept studies									●
Maximize "inbound" (i.e., sales volume/backlog of profitable projects)	●								
Execute EPC projects in accordance with budget and customer requirements		●		●					
Manufacture product			●						
Reduce costs by standardizing, developing, and/or sourcing components and sub-systems				●					
Develop new technologies					●				
Provide life cycle services (maintenance, support, repair)						●			
Develop and market process technologies							●		
Perform enabling and control processes								●	

EPC engineering, procurement, and construction

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## **TRANSLATED VERSION: SPANISH**

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

## **VERSION TRADUCIDA: ESPAÑOL**

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

## **INTRODUCCIÓN**

Según una firma consultora, el 95% de los 50 mejores de Fortune y el 90% de las 50 principales empresas del FTSE han adoptado la estructura de matriz (Thompson 2013). En la literatura académica, la suposición clave es que la matriz, como una forma organizativa compleja, es una respuesta a un entorno empresarial cada vez más complejo:

"Un aumento de la complejidad y la incertidumbre ambiental impulsa la necesidad de la matriz y su complejidad. La introducción de una estructura matricista sigue así la Ley de Variedad Necesaria (Ashby 1956): La complejidad en el medio ambiente debe combinarse con la complejidad en el diseño de la organización" (Burton et al. 2015, p. 37)

Las empresas internacionales, en particular, se enfrentan a un entorno empresarial complejo. Necesitan equilibrar las presiones para adaptarse a los requisitos de los clientes locales con presiones para la integración global, gestionar las diferencias culturales y manejar las diferencias en los regímenes regulatorios en todos los países en los que operan. De hecho, la literatura sobre la gestión internacional plantea que, si bien las empresas en las primeras etapas de la internacionalización pueden adoptar un producto o una estructura geográfica, con el tiempo pasarán a la matriz cuando se conviertan en empresas globales —o "transnacionales"— (Bartlett y Ghoshal 2000; Stopford y Wells 1972).

A pesar de la ubicuidad del concepto, hay pocos estudios sistemáticos que puedan confirmar estos supuestos. Lo que sabemos de los pocos estudios que se han realizado es que la tasa de adopción es muy inferior a la cifra del 95% citada anteriormente, al menos cuando se consideran empresas fuera de los EE.UU. Y el Reino Unido. Por ejemplo, en un estudio realizado entre 82 multinacionales alemanas, sólo 42 de las empresas fueron clasificadas como con una estructura matricista (Wolf y Egelhoff 2013). Sin embargo, incluso esta cifra puede ser demasiado alta, porque se basaba en una definición muy amplia de "matriz": sólo 15 de las 82 empresas tenían la estructura matricista típica asociada a las empresas internacionales, donde un gerente regional informa tanto a un gerente de producto global como al jefe de una unidad regional. En un estudio inédito realizado por una consultora en Noruega, sólo 2 de las 16 grandes empresas internacionales se caracterizaron por tener una estructura matricista, y para los dos casos que se identificaron, sólo un pequeño subconjunto de gerentes estaban "en la matriz", es decir, sólo un subconjunto de gerentes informó a dos o más jefes (Deloitte 2013).

Los estudiosos también han comenzado a cuestionar la validez de la Ley de la Variedad Necesaria de Ashby, mencionada anteriormente (Poulis y Poulis 2016). Una limitación clave de la ley de Ashby es que no distingue entre la complejidad necesaria (es decir, la complejidad interna necesaria para adaptarse a un entorno externo complejo) y la complejidad innecesaria (por ejemplo, la complejidad interna causada por decisiones de diseño de organización subóptimas) (Worren 2012). Sabemos por la literatura profesional



que muchas empresas han estado tratando de simplificar sus estructuras internas, a pesar de que el entorno empresarial no muestra ningún signo de ser menos complejo (Ashkenas 2007).

Por lo tanto, la pregunta que planté en este documento es si es necesariamente cierto que las organizaciones en entornos empresariales complejos gravitan hacia la forma de la matriz. Dado que las estructuras organizativas evolucionan con el tiempo, discuto cómo la estructura de una organización en particular ha evolucionado en el período de 15 años de 2001 a 2016. La organización que utilizo como caso es una división de la firma global de tecnología FMC Technologies (ahora technipfmc). Describo el modelo organizativo adoptado por esta firma al comienzo del período, en 2001, y discuto por qué se ajustó en 2011 y nuevamente en 2015. El caso ilustra cómo se vuelve a diseñar el modelo organizativo de una empresa compleja en respuesta a cambios internos y externos. También muestra cómo se puede simplificar la estructura de matriz mediante la introducción de un modelo alternativo (multidimensional) que no requiere una estructura de notificación dual.

## **CONCLUSIÓN**

La evolución de FMC Subsea en el período 2001-2016 muestra que la matriz no es un "estado final" inevitable para las empresas que se enfrentan a entornos empresariales complejos. En cambio, puede ser una forma transitoria a medida que las empresas evolucionan de una estructura puramente geográfica (o basada en productos) a una estructura multidimensional.

Las investigaciones han demostrado que muchas empresas que adoptan la matriz más tarde la abandonan (Burns y Wholey 1993). Los primeros escritores como Davis y Lawrence (1978) anticiparon que algunas organizaciones que adoptaron la matriz encontrarían que era un diseño inviable y volverían a una estructura anterior. Sin embargo, no anticiparon la capacidad de los gerentes para mejorar aún más el diseño. Su suposición era que las empresas que abandonaban la matriz volverían a una estructura funcional (pág. 226), en lugar de diseñar modelos más simples que pueden cumplir las mismas funciones que la matriz pero a un costo menor debido a una menor complejidad (Ackoff 1999; Worren 2012).

El caso descrito aquí sugiere una opción alternativa para los gerentes que consideran abandonar la matriz y volver a una estructura unidimensional. Al mantener la estructura multidimensional, pero eliminar las relaciones de informes duales e introducir vínculos internos cliente-proveedor entre unidades internas, uno puede obtener algunos de los beneficios de la matriz, pero sin los costos.

## **TRANSLATED VERSION: FRENCH**

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

## **VERSION TRADUITE: FRANÇAIS**

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

## **INTRODUCTION**

Selon un cabinet de conseil, 95% des 50 premières et 90% des 50 premières entreprises du FTSE ont adopté la structure matricielle (Thompson 2013). Dans la littérature universitaire, l'hypothèse clé est que la matrice, en tant que forme organisationnelle complexe, est une réponse à un environnement d'affaires de plus en plus complexe :

« L'augmentation de la complexité et de l'incertitude environnementales entraîne la nécessité de la matrice et sa complexité. L'introduction d'une structure matricielle suit ainsi la loi de la variété requise

(Ashby, 1956) : la complexité de l'environnement doit être assortie à la complexité de la conception de l'organisation » (Burton et al. 2015, p. 37)

Les entreprises internationales, en particulier, sont confrontées à un environnement commercial complexe. Ils doivent trouver un équilibre entre les pressions en faveur de l'adaptation aux besoins des clients locaux et les pressions en faveur de l'intégration mondiale, gérer les différences culturelles et gérer les différences dans les régimes réglementaires entre les pays dans lesquels ils opèrent. En effet, la littérature sur la gestion internationale postule que si les entreprises aux premiers stades de l'internationalisation peuvent adopter un produit ou une structure géographique, elles finiront par passer à la matrice lorsqu'elles deviendront des entreprises mondiales ou « transnationales » (Bartlett et Ghoshal, 2000; Stopford et Wells, 1972).

Malgré l'omniprésence du concept, il existe peu d'études systématiques qui peuvent confirmer ces hypothèses. Ce que nous savons des quelques études qui ont été menées, c'est que le taux d'adoption est bien inférieur au chiffre de 95 % cité ci-dessus, du moins lorsqu'on considère les entreprises en dehors des États-Unis et du Royaume-Uni. Par exemple, dans une étude menée auprès de 82 multinationales allemandes, seulement 42 des entreprises ont été classées comme ayant une structure matricielle (Wolf et Egelhoff 2013). Cependant, même ce chiffre peut être trop élevé, parce qu'il était basé sur une définition très large de la « matrice » : seulement 15 des 82 entreprises avaient la structure matricielle typique associée à des entreprises internationales, où un gestionnaire régional relève à la fois d'un chef de produit mondial et à la tête d'une unité régionale. Dans une étude non publiée réalisée par un cabinet de conseil en Norvège, seulement 2 des 16 grandes entreprises internationales ont été caractérisées comme ayant une structure matricielle, et pour les deux cas qui ont été identifiés, seul un petit sous-ensemble de gestionnaires étaient « dans la matrice », c'est-à-dire que seulement un sous-ensemble de gestionnaires ont signalé à deux patrons ou plus (Deloitte 2013).

Les chercheurs ont également commencé à remettre en question la validité de la Loi d'Ashby sur la variété requise, mentionnée ci-dessus (Poulis et Poulis 2016). L'une des principales limites de la loi d'Ashby est qu'elle ne fait pas la distinction entre la complexité nécessaire (c.-à-d. La complexité interne requise pour s'adapter à un environnement externe complexe) et la complexité inutile (p. Ex., la complexité interne causée par des décisions de conception d'organisation sous-optimales) (Worren, 2012). Nous savons d'après la littérature pratique que de nombreuses entreprises ont tenté de simplifier leurs structures internes, même si l'environnement des affaires ne montre aucun signe de devenir moins complexe (Ashkenas 2007).

Par conséquent, la question que je soulève dans le présent document est de savoir s'il est nécessairement vrai que les organisations dans des environnements d'affaires complexes gravitent vers la forme matricielle. Depuis que les structures organisationnelles évoluent au fil du temps, je discute de l'évolution de la structure d'une organisation particulière au cours de la période de 15 ans allant de 2001 à 2016. L'organisation que j'utilise comme cas est une division de la société technologique mondiale FMC Technologies (aujourd'hui technipfmc). Je décris le modèle organisationnel adopté par ce cabinet au début de la période, en 2001, et je discute des raisons pour lesquelles il a été ajusté en 2011 et de nouveau en 2015. Le cas illustre comment le modèle organisationnel d'une entreprise complexe est repensé en réponse aux changements internes et externes. Il montre également comment la structure matricielle peut être simplifiée en introduisant un modèle alternatif (multidimensionnel) qui ne nécessite pas une structure de déclaration double.

## CONCLUSION

L'évolution de FMC Subsea au cours de la période 2001-2016 montre que la matrice n'est pas un « état final » inévitable pour les entreprises qui font face à des environnements d'affaires complexes. Au lieu de cela, il peut s'agir d'une forme transitoire à mesure que les entreprises évoluent d'une structure purement géographique (ou basée sur des produits) à une structure multidimensionnelle.

La recherche a montré que de nombreuses entreprises qui adoptent la matrice l'abandonnent plus tard (Burns et Wholey, 1993). Les premiers auteurs comme Davis et Lawrence (1978) s'attendaient à ce que

certaines organisations qui adoptent la matrice trouvent qu'il s'agit d'une conception irréalisable et qu'elles retournent à une structure antérieure. Toutefois, ils ne s'attendaient pas à ce que les gestionnaires aient la capacité d'améliorer davantage la conception. Ils ont supposé que les entreprises qui abandonnaient la matrice reviendraient à une structure fonctionnelle (p. 226), au lieu de concevoir des modèles plus simples qui peuvent remplir les mêmes fonctions que la matrice, mais à un coût moindre en raison de la complexité plus faible (Ackoff, 1999; Worren 2012).

Le cas décrit ici suggère une autre option pour les gestionnaires qui envisagent d'abandonner la matrice et de revenir à une structure unidimensionnelle. En maintenant la structure multidimensionnelle, mais en supprimant les relations de double reporting et en introduisant des liens internes client-fournisseur entre les unités internes, on peut obtenir certains des avantages de la matrice, mais sans les coûts.

## **TRANSLATED VERSION: GERMAN**

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## **ÜBERSETZTE VERSION: DEUTSCH**

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

## **EINLEITUNG**

Nach Angaben eines Beratungsunternehmens haben 95 % der 50 führenden Unternehmen von Fortune und 90 % der FTSE-Unternehmen die Matrixstruktur übernommen (Thompson 2013). In der wissenschaftlichen Literatur ist die Hauptannahme, dass die Matrix als komplexe Organisationsform eine Antwort auf ein immer komplexeres Geschäftsumfeld ist:

"Eine Zunahme der Umweltkomplexität und Unsicherheit treibt die Notwendigkeit der Matrix und ihre Komplexität an. Die Einführung einer Matrixstruktur folgt somit dem Gesetz der Requisitenvielfalt (Ashby 1956): Komplexität in der Umwelt muss mit Komplexität im Design der Organisation abgeglichen werden" (Burton et al. 2015, S. 37)

Vor allem internationale Unternehmen stehen vor einem komplexen Geschäftsumfeld. Sie müssen den Druck zur Anpassung an die lokalen Kundenanforderungen mit dem Druck auf die globale Integration in Einklang bringen, kulturelle Unterschiede bewältigen und Die Unterschiede in den Regulierungssystemen in den Ländern, in denen sie tätig sind, bewältigen. Tatsächlich stellt die Literatur über internationales Management fest, dass Unternehmen in den frühen Stadien der Internationalisierung zwar ein Produkt oder eine geografische Struktur annehmen können, sie aber schließlich zur Matrix wechseln werden, wenn sie zu globalen – oder "transnationalen" – Unternehmen werden (Bartlett und Ghoshal 2000; Stopford and Wells 1972).

Trotz der Allgegenwart des Konzepts gibt es nur wenige systematische Studien, die diese Annahmen bestätigen können. Was wir aus den wenigen Studien wissen, die durchgeführt wurden, ist, dass die Adoptionsrate weit unter den oben genannten 95 % liegt, zumindest wenn man Unternehmen außerhalb der USA und des Vereinigten Königreichs betrachtet. So wurden in einer Studie unter 82 deutschen multinationalen Unternehmen nur 42 der Unternehmen als Matrixstruktur eingestuft (Wolf und Egelhoff 2013). Aber auch diese Zahl mag zu hoch sein, weil sie auf einer sehr weit gefassten Definition von "Matrix" beruhte: Nur 15 der 82 Unternehmen hatten die typische Matrixstruktur, die mit internationalen Unternehmen verbunden ist, wobei ein Regionalmanager sowohl einem globalen Produktmanager als auch dem Leiter einer regionalen Einheit berichtet. In einer unveröffentlichten Studie, die von einem

Beratungsunternehmen in Norwegen durchgeführt wurde, wurden nur 2 von 16 großen internationalen Unternehmen als matrixstrukturiert charakterisiert, und für die beiden Fälle, die identifiziert wurden, befanden sich nur eine kleine Teilmenge der Manager "in der Matrix", d. H. Nur eine Teilmenge der Manager, die zwei oder mehr Chefs gemeldet wurden (Deloitte 2013).

Gelehrte haben auch begonnen, die Gültigkeit von Ashbys Gesetz der Requisitenvielfalt in Frage zu stellen, auf das oben Bezug genommen wird (Poulis und Poulis 2016). Eine wesentliche Einschränkung des Ashby-Gesetzes besteht darin, dass es nicht zwischen der notwendigen Komplexität (d. H. Der internen Komplexität, die erforderlich ist, um sich an eine komplexe externe Umgebung anzupassen) und unnötiger Komplexität (z. B. Interner Komplexität, die durch suboptimale Organisationsentscheidungen verursacht wird) (Worren 2012) unterscheidet. Aus der Praktiker-Literatur wissen wir, dass viele Firmen versucht haben, ihre internen Strukturen zu vereinfachen, auch wenn das Geschäftsumfeld keine Anzeichen dafür zeigt, dass es weniger komplex wird (Ashkenas 2007).

Daher stelle ich in diesem Papier die Frage, ob es notwendigerweise wahr ist, dass Organisationen in komplexen Geschäftsumgebungen sich der Matrixform zuwenden. Da sich die Organisationsstrukturen im Laufe der Zeit weiterentwickeln, bespreche ich, wie sich die Struktur einer bestimmten Organisation im 15-Jahres-Zeitraum von 2001 bis 2016 entwickelt hat. Die Organisation, die ich als Fall benutze, ist eine Abteilung des globalen Technologieunternehmens FMC Technologies (jetzt technipmc). Ich beschreibe das Organisationsmodell, das dieses Unternehmen zu Beginn des Zeitraums, im Jahr 2001, angenommen hat, und erwäge, warum es 2011 und 2015 angepasst wurde. Der Fall veranschaulicht, wie das Organisationsmodell eines komplexen Unternehmens als Reaktion auf interne und externe Änderungen neu gestaltet wird. Es zeigt auch, wie die Matrixstruktur durch die Einführung eines alternativen (multidimensionalen) Modells vereinfacht werden kann, das keine duale Berichtsstruktur erfordert.

## **SCHLUSSFOLGERUNG**

Die Entwicklung von FMC Subsea im Zeitraum 2001-2016 zeigt, dass die Matrix kein unvermeidlicher "Endzustand" für Unternehmen ist, die mit komplexen Geschäftsumgebungen konfrontiert sind. Stattdessen kann es sich um eine vorübergehende Form drehen, da sich die Unternehmen von einer rein geographischen (oder produktbasierten) Struktur zu einer multidimensionalen Struktur entwickeln.

Untersuchungen haben gezeigt, dass viele Firmen, die die Matrix übernehmen, sie später aufgeben (Burns and Wholey 1993). Frühe Autoren wie Davis und Lawrence (1978) erwarteten, dass einige Organisationen, die die Matrix übernahmen, es für ein undurchführbares Design halten würden und zu einer früheren Struktur zurückkehren würden. Sie haben jedoch nicht damit gerechnet, dass Manager in der Lage sind, das Design weiter zu verbessern. Ihre Annahme war, dass Unternehmen, die die Matrix aufgegeben haben, zu einer funktionalen Struktur zurückkehren würden (S. 226), anstatt einfachere Modelle zu entwerfen, die die gleichen Funktionen wie die Matrix erfüllen können, aber zu niedrigeren Kosten aufgrund geringerer Komplexität (Ackoff 1999; Worren 2012).

Der hier beschriebene Fall schlägt eine alternative Option für Manager vor, die erwägen, die Matrix aufzugeben und zu einer eindimensionalen Struktur zurückzukehren. Durch die Beibehaltung der multidimensionalen Struktur, aber das Entfernen der dualen Berichtsbeziehungen und die Einführung interner Kunden-Lieferanten-Verbindungen zwischen internen Einheiten kann man einige der Vorteile der Matrix nutzen – allerdings ohne die Kosten.

## **TRANSLATED VERSION: PORTUGUESE**

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

## VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsabilize os autores originais responsáveis por estes erros.

### INTRODUÇÃO

De acordo com uma empresa de consultoria, 95% do top 50 da Fortune e 90% das 50 maiores empresas da FTSE adotaram a estrutura matriz (Thompson 2013). Na literatura académica, o pressuposto fundamental é que a matriz, como forma organizacional complexa, é uma resposta a um ambiente de negócios cada vez mais complexo:

"O aumento da complexidade e da incerteza ambiental impulsiona a necessidade da matriz e da sua complexidade. A introdução de uma estrutura matricial segue assim a Lei da Variedade Necessária (Ashby 1956): A complexidade no ambiente deve ser acompanhada de complexidade no desenho da organização" (Burton et al. 2015, p. 37)

As empresas internacionais, em particular, enfrentam um ambiente de negócios complexo. Têm de equilibrar as pressões de adaptação às necessidades dos clientes locais com pressões para a integração global, gerir as diferenças culturais e lidar com as diferenças nos regimes regulamentares em todos os países em que operam. Com efeito, a literatura sobre a gestão internacional pressupõe que, embora as empresas nas fases iniciais da internacionalização possam adotar um produto ou estrutura geográfica, acabarão por mudar para a matriz quando se tornarem empresas globais ou "transnacionais" (Bartlett e Ghoshal 2000; Stopford and Wells 1972).

Apesar da ubiquidade do conceito, existem poucos estudos sistemáticos que podem confirmar estes pressupostos. O que sabemos dos poucos estudos realizados é que a taxa de adoção é muito inferior à taxa de 95% acima citada, pelo menos quando se consideram empresas fora dos EUA e do Reino Unido. Por exemplo, num estudo realizado entre 82 multinacionais alemãs, apenas 42 das empresas foram classificadas como tendo uma estrutura matricial (Wolf e Egelhoff 2013). No entanto, mesmo este valor pode ser demasiado elevado, porque se baseou numa definição muito ampla de "matriz": Apenas 15 das 82 empresas tinham a estrutura matriz típica associada a empresas internacionais, onde um gestor regional reporta tanto a um gestor global de produtos como ao chefe de uma unidade regional. Num estudo inédito realizado por uma empresa de consultoria na Noruega, apenas 2 em cada 16 grandes empresas internacionais foram caracterizadas como tendo uma estrutura matricial, e para os dois casos que foram identificados, apenas um pequeno subconjunto de gestores estava "na matriz", ou seja, apenas um subconjunto de gestores reportado a dois ou mais padrões (Deloitte 2013).

Os estudiosos também começaram a questionar a validade da Lei da Variedade Necessária de Ashby, referida acima (Poulis e Poulis 2016). Uma limitação fundamental da lei de Ashby é que não distingue entre a complexidade necessária (isto é, a complexidade interna necessária para se adaptar a um ambiente externo complexo) e a complexidade desnecessária (por exemplo, complexidade interna causada por decisões de conceção de organizações sub-ideais) (Worren 2012). Sabemos pela literatura praticante que muitas empresas têm tentado simplificar as suas estruturas internas, embora o ambiente de negócios não mostre qualquer sinal de se tornar menos complexo (Ashkenas 2007).

Por conseguinte, a questão que levanto neste artigo é se é necessariamente verdade que as organizações em ambientes de negócios complexos gravitam para a forma matriz. Desde que as estruturas organizacionais evoluem ao longo do tempo, discuto como a estrutura de uma determinada organização evoluiu no período de 15 anos de 2001 a 2016. A organização que uso como caso é uma divisão da empresa tecnológica global FMC Technologies (agora technipfmc). Descrevo o modelo organizacional adotado por esta empresa no início do período, em 2001, e discuto por que razão foi ajustado em 2011 e novamente em 2015. O caso ilustra como o modelo organizacional de uma empresa complexa é remodelada em resposta a alterações internas e externas. Mostra também como a estrutura matriz pode ser simplificada introduzindo um modelo alternativo (multidimensional) que não requer uma estrutura de duplo relatório.

## CONCLUSÃO

A evolução do Subsea da FMC no período 2001-2016 mostra que a matriz não é um inevitável "estado final" para as empresas que enfrentam ambientes de negócio complexos. Em vez disso, pode ser uma forma transitória à medida que as empresas evoluem de uma estrutura puramente geográfica (ou baseada em produtos) para uma estrutura multidimensional.

A investigação mostrou que muitas empresas que adotam a matriz mais tarde abandonam-na (Burns e Wholey 1993). Escritores como Davis e Lawrence (1978) antecipavam que algumas organizações que adotassem a matriz a considerariam um design inviável e voltariam a uma estrutura anterior. No entanto, não anteciparam a capacidade dos gestores para melhorarem ainda mais o design. O seu pressuposto era que as empresas que abandonaram a matriz voltariam a uma estrutura funcional (p. 226), em vez de conceberem modelos mais simples que possam desempenhar as mesmas funções que a matriz, mas a um custo mais baixo devido à menor complexidade (Ackoff 1999; Worren 2012).

O caso aqui descrito sugere uma opção alternativa para os gestores que ponderam abandonar a matriz e regressar a uma estrutura unidimensional. Mantendo a estrutura multidimensional, mas removendo as relações de duplo reporte, e introduzindo ligações internas entre o cliente-fornecedor entre unidades internas, pode-se obter alguns dos benefícios da matriz - mas sem os custos.