

THE INFLUENCE OF ORGANIZATIONAL CULTURE ON TYPES OF INNOVATION

Mafalda de CASTRO

School of Economics and Management, University of Porto
Rua Dr. Roberto Frias, s/n, 4200-464 Porto, PT
mafalda.castropereira@gmail.com

Raquel MENESES

School of Economics and Management, University of Porto
Rua Dr. Roberto Frias, s/n, 4200-464 Porto, PT
raquelm@fep.up.pt

Abstract

The importance of innovation in the successful performance of companies has been defended and analyzed since the 20th century. Essentially, due to the adaptability, it provides to companies in an increasingly uncertain world, looks at the turmoil in business that the current Covid-19 pandemic has caused. Many are the determining factors for the innovative strategy of organizations. One of the most important is the organizational culture. The purpose of this article is to analyze the influence of cultural traits in promoting or inhibiting the adoption of innovations. The investigation uses a sample of 100 Portuguese companies to examine the preponderance of organizational culture in the adoption of specific types of innovation. The results confirm two of the four hypotheses raised and concluded that organizational culture is a clear predictor of innovation. Namely, cultures of adhocracy adopt product innovations and market cultures, process innovations. The main contribution of this article is to analyze, test, and draw significant conclusions about the influence of dominant cultures, as a whole, on the types of innovation.

Keywords

Adhocracy; Competitive values framework; Innovation adoption; Market orientation; Portuguese companies; Rational culture

Introduction

Companies face ever-changing environments. Innovation emerges to respond efficiently to demand, making the most of organizational resources. "Innovation constitutes part of the system that produces it." (Lam, 2004, p. 3), cause and effect, becomes the engine of change both inside and outside the organizations and, according to Ahmed (1998) organizational culture is its main determinant.

Believing in the preponderant role of organizational culture in innovation, it remains to effectively perceive this connection. Valencia et al. (2011) suggest the need for different organizational cultures according to the innovation strategy. When analyzing how the innovation strategy was affected by each dimension of the culture, they concluded that not all dimensions of an only culture have the same effect in driving innovation, leaving the door open for the possibility of, even more, formal cultures, having innovation-oriented strategies, balancing formal rules and procedures and other dominant characteristics.

It seems agreed that the organizational culture is preponderant for the innovative orientation of organizations (Ahmed, 1998; Carmeli, 2005; Büschgens et al., 2013). Nevertheless, Valencia et al. (2019, p.56) claim that “empirical research remains somewhat limited”, insofar as existing investigations don't approach the dominant organizational culture of institutions but focus on some cultural characteristics. The main objective of this investigation is to discover if each dimension of an organizational culture induces innovation.

Theoretical framework

Innovation implies transforming new ideas into renewed sources of value. The nature of innovation is changing in response to society's challenges (Hekkert et al., 2020). Climate change, digitalization, the sharing economy, sustainability, and, more recently, a global pandemic, require companies to take a broader view of innovation than the traditional creation of new products and technologies.

Innovation Radar helps organizations to open the perception of innovation to any area of the business and, thus, better compare your strategy to that of your competitors. “Using that information, the company could then identify opportunities and prioritize on which dimensions to focus its efforts” (Sawhney et al., 2006, p. 81), and thereby create a new substantial or radical value for customers, changing one or more dimensions of the existing business system.

From this perspective, innovation is a new business design challenge. To innovate, it's necessary to guarantee the businesses, activities, processes, brands, customer experience, etc., necessary to effectively put this work on the market and, to this end, organizations need to look at the new offer they are trying to bring to the market and, intentionally and in advance, make significant changes to the supply chain for innovation to work successfully. The four quadrants of Innovation Radar, which are key dimensions, focus on process, product, organizational, and marketing.

Product innovations are new goods or services, introduced to the market, to respond to a specific need of users, while process innovations correspond to the introduction of differentiated elements in an organization's production or service operations. And, according to its definition, a product innovation occurs when a good or service is idealized, produced, and used, and process innovation is completed only after its operationalization (Knight, 1967). Organizational innovation concerns the parameterization of tasks or workflow mechanisms. Its exact definition is complex, since it is influenced by structures, processes, and practices and, as such, can be seen from only one of these three perspectives. However, in a global view of all these, organizational innovation is made up of management actions aimed at renovating and improving structures, adding processes, and implementing new practical management concepts, to promote the achievement of the organization's objectives (Prasad and Junni, 2016). Marketing innovation is directly related to the organization's integrated response to create a better total customer experience. It consists of implementing new strategies to interact with the customer at each point of contact, including the implementation of significant changes in the design or packaging of the product offered, in the market positioning, and/or in the organization's sales channels (Harel et al., 2020).

Despite the importance of innovation, its effect on the performance of organizations varies depending on the strategic orientation (Valencia et al., 2011) which, in turn, is influenced by organizational culture. According to Cameron (1988), the definition of organizational culture isn't consensual, it goes so far as to state eighteen different definitions, by various authors, to express its ambiguity. It concludes, however, that all definitions have "the view that culture is something the organization has (not is)" (Cameron, 1988, p. 9) given that organizational culture is made up of lasting attributes, centered on values, assumptions, and beliefs shared by its members.

Quinn e Rohrbaugh (1983) Competing Values Framework (CVF) provides significant organizational support for the identity aspects of organizational culture, allowing an analysis focused on cultural aspects and evaluation of the relationship with innovation. The structure is divided into four quadrants arranged by two pairs of opposite values, flexibility *versus* control, and internal *versus* external focus, where cultures are classified according to their two main dimensions. The first dimension of value is related to the organizational focus, which may have an internal emphasis on the well-being and development of the members of the organization or an external emphasis on the well-being and development of the organization itself. The second dimension refers to the organizational structure, with opposite poles in the stability/control or flexibility (Figure 1).

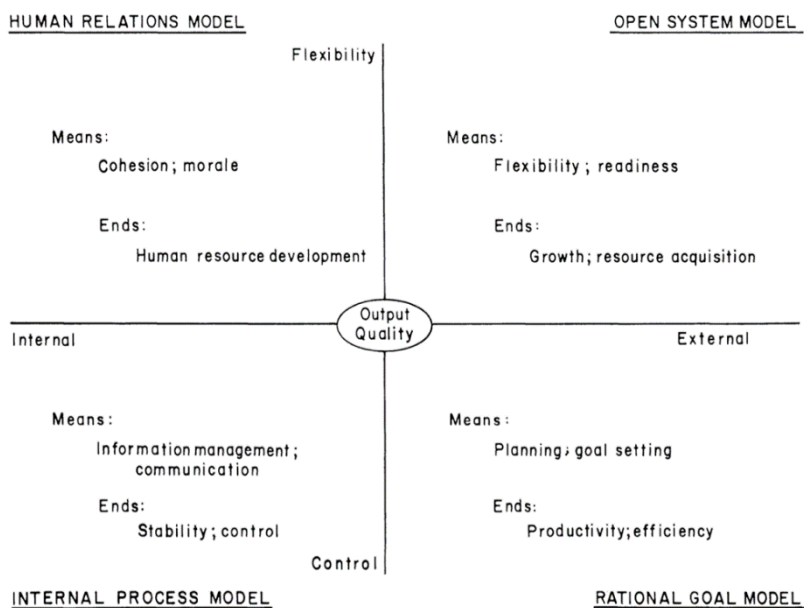


Figure 1. Competing Values Framework
(Quinn & Rohrbaugh, 1983, p.369)

In the scheme, it is also possible to denote the third dimension of value, regarding organizational means and ends. The four organizational culture traits described by the model are Adhocracy, Clan Culture, Market Culture, and Hierarchy.

The hierarchy is characterized by privileging a stable environment, highly coordinated and integrated tasks, and clear lines of authority for decision making, with standardized rules and procedures (Cameron & Quinn, 2011). However, as time progresses, new tools for managing and organizing the workplace emerge, which can alter the ideal form of organization of institutions. Chen and Chang (2012) even show that formal structures increase the adoption of organizational innovations through their effects on absorption capacity and speed of decision. So, it is expected that:

H1: Hierarchical cultures are predictors of the adoption of organizational innovations.

Market culture values competence and achievement. It's characterized by planning, clear definition of objectives, and centralized control, with the main objective of increasing productivity and, consequently, profitability (Cameron & Quinn, 2011). This preference for productivity and efficiency isn't directly related to the intention to create something new but to foster innovative efforts through the development of continuous improvement capabilities (Büschgens et al., 2013). Process innovations serve, precisely, as a means to achieve results, and are not an objective in themselves (Crossan & Apaydin, 2010), as follows:

H2: Market cultures are predictors of the adoption of process innovations

The clan culture is concerned with the development of human resources and customer satisfaction. On the one hand, creating and maintaining knowledge of the workforce, the primary objective of this culture is a predictor of generation and adoption of innovations (Boothby et al., 2010). On the other hand, these organizations believe that trusting and committing to their members improves open communication (Cameron & Quinn, 2011). Open communication fosters the ability to respond to customer needs and desires (Zaltman et al., 1973) and, according to Naidoo (2010), it facilitates the response to market demands through marketing innovations. As such, it is expected that:

H3: Clan cultures are predictors of the adoption of marketing innovations.

Adhocracy is characterized by a focus on developing new products and services and preparing for the future. Focused on external positioning with a high degree of flexibility, these organizations believe that change facilitates obtaining new resources and that flexibility promotes risk-taking (Hammond et al., 2011). An important challenge for these organizations is to produce innovative products and services and adapt quickly to new opportunities. "The emphasis is on being at the leading edge of new knowledge, products, and services." (Cameron & Quinn, 2011, p.51), including Prajogo e McDermott (2011) found a positive relationship between this trait of culture and product innovation. Therefore,

H4: Adhocratic cultures are predictors of adopting product innovations.

Methodology

The empirical study uses a quantitative method to test the hypotheses presented above. Applies the most updated revised version of the Organizational Culture Assessment Instrument (OCAI), developed by Cameron and Quinn (2006), to classify, identify, and measure cultural traits. And it uses the Oslo Manual published by the Organization for Economic Cooperation and Development (2005), to classify and interpret innovation activities and uses the standard questionnaire developed by Eurostat to categorize these same activities.

Data were collected through an online questionnaire, based on the Likert scale, which is widely used in research related to behavioral sciences (Bermudes et al., 2016). The survey was divided into three segments, the first of which includes questions about the organization's characteristics, such as size and longevity, considered control variables for the investigation. The second addresses the innovation activities carried out by organizations to identify the most adopted type of innovation. The third is a single question with 24 alternatives to assess the organization's cultural trait. The questionnaire referred to innovations and innovation activities adopted during the three years from 2017 to 2019, inclusive. As in the original survey, we assumed that the companies' response should consider the innovations adopted by them, even if originally developed and/or already used by other companies, only if they were required to be new or significantly improved by the adopting company.

The population under analysis included 4269 companies, registered in 2018, of the three most exporting Portuguese sectors. 2130 firms were contacted, having obtained 104 responses (response rate of 4.88%, in line with works of this kind), 100 responses were considered valid.

The Structural Equations Model (SEM) was applied with Partial Least Squares (PLS), a smooth approach to SEM, with no assumptions about data distribution (Vinzi et al., 2010), in a two-step process: validation of the measurement model and study of the structural model.

The starting model includes all cultural traits, types of innovation, investments in innovation capacity, and market introduction of innovations (Figure 2).

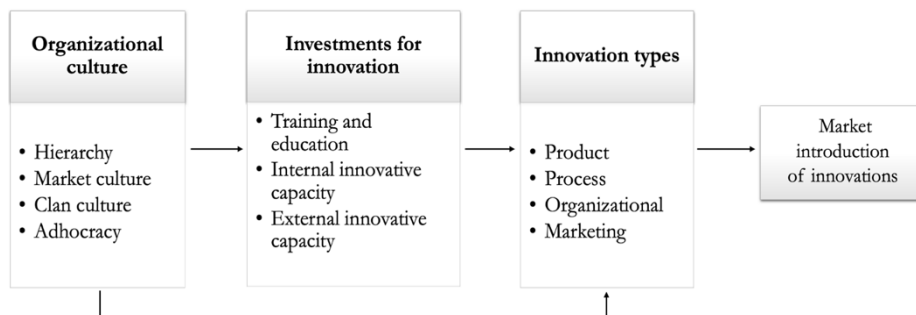


Figure 2. The first model tested

Results

Validating the measurement model

Organizational culture is an unobservable variable (construct), what is visible in the organization are its effects. For organizational cultures to have internal consistency between the measured values of the cultural manifestations, the Cronbach alpha, and Composite Reliability indicators must be greater than 0.70 (Hair, et. al, 2019). Refers to convergent validity, which occurs when the Average Extracted Variance (AVE) is greater than 50% (Nunnally, et al., 1994). Finally, to determine whether the measured organizational cultures were truly different from each other, discriminant validity was tested. Tables 1 and 2 show that the latent variables with reflective indicators obey all the criteria mentioned above (the measured models had to be refined by removing some indicators: Dominant characteristics and Management of Employees).

Table 1. Reliability and convergent validity of constructs

Culture trait	Cronbach's alfa	Composite Reliability	AVE
Adhocracy	0.861	0.906	0.706
Clan culture	0.828	0.888	0.668
Hierarchy	0.859	0.904	0.703
Market culture	0.849	0.899	0.691

Table 2. Discriminant validity

Culture trait	Adhocracy	Clan culture	Hierarchy	Market culture
Adhocracy	0.840			
Clan culture	0.789	0.817		
Hierarchy	0.647	0.716	0.838	
Market culture	0.817	0.778	0.798	0.832

For formative constructs, both types of innovation and investments in innovation capacity, the risk of multicollinearity of the measures was tested, to understand how much indicators overlap, being desirable to overlap the minimum. The maximum value of the variation inflation factor (VIF) was 1.344 (less than 3), which suggests that multicollinearity is not a threat in this data set (Hair et al., 2019). The weights of the indicators and the factor loadings were also analyzed to assess their significance, despite the small sample size. Values of the weight of the indicators close to zero suggest a weak relationship and close to 1 indicate a strong relationship (Hair et al., 2019).

The values of the analysis of the measures previously exposed are explained in table 3, and only the indicator "New media or techniques for product promotion" was removed from the model because both the values "weight" and "loading" are below the recommended limits. Table 4 shows the analysis of the formative latent variable Marketing Innovation formed only by the remaining indicators.

Table 3. Collinearity statistics, significance, and relevance of the indicators

Latent Variable	Indicator	VIF	Loading	Weight
Training and Education	Training for innovative activities	1.015	0.826	0.758
	Acquisition of existing knowledge from other enterprises or organizations	1.015	0.659	0.567
External Innovative Capacity	External R&D	1.152	0.647	0.378
	Acquisition of machinery, equipment, software, and buildings	1.113	0.790	0.587
	Other contracted out innovation activities	1.199	0.711	0.410
Internal Capacity	In-house R&D	1.041	0.705	0.561
	Design	1.041	0.835	0.724
Product innovations	Goods innovations	1.101	0.826	0.646
	Service innovations	1.101	0.788	0.592
Process innovation	New or significantly improved methods of manufacturing or producing goods or services	1.203	0.930	0.765
	New or significantly improved logistics, delivery, or distribution methods for your inputs, goods, or services	1.294	0.595	0.245
	New or significantly improved supporting activities for your processes	1.344	0.622	0.229
Organisational innovation	New business practices for organizing procedures	1.310	0.771	0.416
	New methods of organizing work responsibilities and decision making	1.326	0.788	0.436
	New methods of organizing external relations with other firms or public institutions	1.310	0.779	0.430
Marketing innovation	Significant changes to the aesthetic design or packaging of a good or service	1.285	0.765	0.469
	New media or techniques for product promotion	1.294	0.582	0.149
	New methods for product placement or sales channels	1.247	0.753	0.436
	New methods of pricing goods or services	1.213	0.666	0.339

Table 4. New statistics for the latent variable Marketing Innovation

Latent Variable	Indicator	VIF	Loading	Weight
Marketing innovation	Significant changes to the aesthetic design or packaging of a good or service	1.157	0.672	0.379
	New methods for product placement or sales channels	1.218	0.814	0.543
	New methods of pricing goods or services	1.177	0.716	0.423

Structural model

The size and significance of the model path coefficient were analyzed, using the “Bootstrapping” model and, again, accepting a p-value <0.1.

The internal model suggests that the Market Culture directly affects the adoption of Process Innovations and that the Adhocratic Culture directly influences the adoption of Product Innovations and the investment in External Innovative Capacity and Training and Education (table 5).

Table 5. PLS-SEM results of the final model

Path Coefficients		Sample	T Statistics	P Values
Adhocracy	External Innovative Capacity	0.353	3.535	0.000
	Training and Education	0.182	1.997	0.046
	Product Innovation	0.174	2.037	0.042
Market Culture	Process Innovation	0.197	2.631	0.009
External Innovative Capacity	Process Innovation	0.218	1.779	0.076
	Product Innovation	0.457	4.472	0.000
Training and Education	Marketing Innovation	0.375	4.032	0.000
	Organizational Innovation	0.512	6.697	0.000
	Process Innovation	0.425	4.357	0.000
Process Innovation	Market introduction of innovations	0.202	2.049	0.041
Product Innovation	Market introduction of innovations	0.455	4.312	0.000

The hypothetical path relationship between Market and Process Innovation is statistically significant, as is the path relationship between Adhocracy and Product Innovation. Thus, it can be concluded that Market Culture is a strong predictor of the adoption of process innovations, just as Adhocracy is of product innovations.

Conclusions

This study is an empirical investigation, carried out with primary data, to determine the effects of organizational culture on the innovation of companies in Portuguese strategic export sectors. In the four hypotheses raised, we propose that the organizational culture is a predictor of innovation. To test these hypotheses, the four organizational culture traits were inserted into the model.

As predicted, the culture of adhocracy is positively related to the adoption of product innovations and the market culture with the adoption of process innovations, which provides support for H2 and H4 (Table 5). To further study the relationship between these two cultural traits and the adoption of innovation, additional analyzes were carried out on the effect of investments in innovation. An interesting conclusion was derived from this analysis: the culture of adhocracy is positively related to the

innovative orientation. This trait of culture does not directly predict the adoption of process, organizational or marketing innovations. However, although this hypothetical relationship of the path is not statistically significant, the adhocratic culture indirectly predicts the adoption of these types of innovation by investing in innovation, namely in Training and Education and in External Innovative Capacity.

In relation to the market culture, investments in innovation were not very relevant as to the type of innovation adopted by organizations. However, they proved to be preponderant for the introduction of innovations in the market. The findings indicate that, regardless of organizational culture, the adoption of product and process innovation types and investments in education and training and external innovation capacity will have a positive effect on the introduction of innovations in the market. However, contrary to expectations, hierarchical and team cultures do not show to have a positive effect on the adoption of innovations. In line with these conclusions, it appears that the external orientation of organizations can promote the adoption and subsequent introduction of innovations in the market.

Considering the conclusions of this study, it would be interesting to analyze not only the perception of organizations on organizational and marketing innovations, which may eventually be underestimated by companies but also to understand how organizations with an internal focus can improve their innovative capacity. Future research should still analyze the effect on the performance of adopting a specific innovation type. One thing is certain, the appetite of adhocratic cultures for innovation is almost indisputable.

The main contribution of this study is to link the adoption of different types of innovation to the dominant organizational culture. Specifically, adhocratic and market cultures prove to be impacting on various types of innovation. In common, they have an external orientation, towards the market. According to Udriyah et al. (2019), if market orientation increases, innovation will also increase. Affirming that "Market orientation and innovation partially have positive and significant influences on business performance, both directly and indirectly" Thus, we can conclude that companies wishing to see their performances improved should rethink the importance given to the signals emitted by the market and their influence on their decision making.

The second implication evident in the conclusions of the data analysis is the relevance of the training and education of the members of the organization. The organization's capacity to absorb and generate innovations is positively related to the knowledge of the people who compose it (Bittencourt et al, 2019). Consistently, investing in the development of the members of the organization will certainly bring you advantages in terms of competitiveness and innovation. The importance of this contribution is underlined by the fact that companies that adopt innovations and simultaneously invest in the training of human resources obtain greater productivity gains (Boothby et al., 2010).

In short, market orientation and investment in skills are predictors of innovation and, consequently, enhancers of competitive advantages.

References

- Ahmed, K.P. (1998). Culture and climate for innovation. *European Journal of Innovation Management* 1(1), 30–43.
- Bermudes, W.L., Santana, B.T., Braga, J.H.O., & Souza, P.H. (2016). Tipos de Escalas Utilizadas em Pesquisas e Suas Aplicações. *Revista Vértices* 18(2), 7–20.
- Bittencourt, B. A., Galuk, M. B., Daniel, V. M., & Zen, A. C. (2019). Cluster Innovation Capability: a systematic review. *International Journal of Innovation: IJI Journal* 7(1), 26–44.
- Boothby, D., Dufour, A., & Tang, J. (2010). Technology adoption, training and productivity performance. *Research Policy*, 39(5), 650–661.
- Büschgens, T., Bausch, A., & Balkin, D. B. (2013). Organizational culture and innovation: A meta-analytic review. *Journal of Product Innovation Management* 30(4), 763–781.
- Cameron, K.S. (1988). *The conceptual foundation of organizational culture*.
- Cameron, K.S., & Quinn, R.E. (2006). *Diagnosing and Changing Organizational Culture Based on the Competing Values Framework*. Jossey-Bass.
- Cameron, K.S., & Quinn, R.E. (2011). *Diagnosing and changing organizational culture: Based on the competing values framework*. John Wiley & Sons.
- Carmeli, A. (2005). The relationship between organizational culture and withdrawal intentions and behavior. *International Journal of Manpower*.
- Chen, S. T., & Chang, B. G. (2012). The effects of absorptive capacity and decision speed on organizational innovation: a study of organizational structure as an antecedent variable. *Contemporary Management Research* 8(1).
- Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies* 47(6), 1154–1191.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*.
- Hammond, M.M., Neff, N.L., Farr, J.L., Schwall, A.R., & Zhao, X. (2011). Predictors of individual-level innovation at work: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts* 5, 90–105.
- Harel, R., Schwartz, D., & Kaufmann, D. (2020). Organizational culture processes for promoting innovation in small businesses. *EuroMed Journal of Business*.
- Hekkert, M. P., Janssen, M. J., Wesseling, J. H., & Negro, S. O. (2020). Mission-oriented innovation systems. *Environmental Innovation and Societal Transitions*, 34, 76–79.
- Knight, K. E. (1967). A Descriptive Model of the Intra-Firm Innovation Process. *The Journal of Business* 40(4).
- Lam, A. (2004). Munich Personal RePEc Archive Organizational Innovation.
- Naidoo, V. (2010). Firm survival through a crisis: The influence of market orientation, marketing innovation and business strategy. *Industrial Marketing Management* 39(8), 1311–1320.
- Nunnally, J. C. (1994). *Psychometric theory 3E*. Tata McGraw-hill Education.
- Organization for Economic Co-operation and Development, & Statistical Office of the European Communities. (2005). Oslo manual : guidelines for collecting and interpreting innovation data. Organization for Economic Co-operation and Development.

- Prajogo, D. I., & McDermott, C. M. (2011). The relationship between multidimensional organizational culture and performance. *International Journal of Operations & Production Management*.
- Prasad, B., & Junni, P. (2016). CEO transformational and transactional leadership and organizational innovation. *Management Decision*.
- Quinn, R. E., & Rohrbaugh, J. (1983). A Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to. *Management Science* 29(3).
- Sawhney, M., Wolcott, R. C., & Arroniz, I. (2006). The 12 different ways for companies to innovate. *MIT Sloan Management Review* 47(3), 75–81.
- Udriyah, U., Tham, J., & Azam, S. (2019). The effects of market orientation and innovation on competitive advantage and business performance of textile SMEs. *Management Science Letters* 9(9), 1419-1428.
- Valencia, J. C. N., Valle, R. S. & Jiménez, D. J. (2019). Organizational culture effect on innovative orientation. *Management Decision* 49(1), 55-72.
- Valencia, J. C. N., Jiménez, D. J., & Valle, R. S. (2011). Innovation or imitation? The role of organizational culture. *Management Decision* 49(1), 55–72.
- Vinzi, V. E., Chin, W. W., Henseler, J., & Wang, H. (2010). *Handbook of partial least squares* (Vol. 201, No. 0). Berlin: Springer.
- Zaltman, G., Duncan, R., & Holbek, J. (1973). *Innovations and Organizations*. Wiley-Interscience.