The role and antecedents of contextual intelligence in complex decision-making environments: The case of the pharmaceutical/biotech sector

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A B S T R A C T
Objective: The objective of this article is to explore the concept of contextual intelligence (CI) as an important individual trait in complex decision-making environments and to understand its antecedents.
Research Design & Methods: We surveyed 52 professionals from the pharmaceutical/biotech sector to explore the antecedents of CI behaviours by using Spearman's rho correlation analysis, Student's t-tests, and a two-stage cluster analysis.
Findings: Gender does not appear to differentiate the level of CI, while age is only negatively correlated with future-minded behaviour. Respondents with doctorate education were characterised by a higher level of communitarian behaviours than those with lower education qualification attainment.
Implications & Recommendations: In roles which are subject to VUCA (volatility, uncertainty, complexity, and ambiguity) conditions, the integration of linguistics, cultural awareness, and analytical abilities are important besides interpersonal skills, especially in face-to-face or virtual interactions.
Contribution & Value Added: Our study provides a novel empirical contribution to the concept of CI through an exploratory study of medical affairs professionals and their self-reported CI behaviour profiles, including several individual-level characteristics.

INTRODUCTION

Scholars have long called for increased attention to the context of decision-making (Elbanna & Child, 2007; Elbanna *et al.*, 2020; Hough & White, 2003; Shepherd & Rudd, 2014). In particular for strategic decisions which can be regarded as 'ill-structured, nonroutine, uncertain and pervasive' (Shepherd & Rudd, 2014, p. 340), the context which needs to be taken into account pertains to the top management team (TMT), strategic decision-specific characteristics, the external environment, or the characteristics of the firm itself. While scholars have long urged to pay more attention to the context in different areas, such as strategy, management or entrepreneurship, the relevance of considering contextual variables in international entrepreneurship (IE) and international business (IB) studies has surfaced relatively recently (Child, 2009; Child *et al.,* 2022; Elbanna *et al.,* 2020; Reuber *et al.,* 2017; Teagarden *et al.,* 2018). In the field of IB, this context is particularly complex, as decision-makers are confronted with several diverse and interrelated economic, cultural, institutional, political, social, and technological as well as other environments across national and organisational borders (Child *et al.,* 2022).

Shapiro, Von Glinow and Xiao (Shapiro *et al.,* 2007) coined the term 'polycontextuality,' which refers to multiple and qualitatively different contexts embedded within one another, which contribute to individuals' – and thus organisations' – enactment of their situation.

With regard to the aforesaid external context, firms have to operate in a complex environment which may be described as a VUCA, *i.e.* characterised by volatility, uncertainty, complexity, and ambiguity (Breen, 2017; Sarkar, 2016). It is in turbulent environments where Kutz and Bamford-Wade (2013) argue that the relevance of monitoring and responding proactively to the behaviour of other people with appropriate adaptation matters in particular, since the notion of context pertains to the interactions and interdependencies among and between individuals within an organisation and beyond it. Thus, an important characteristic of decision makers can be referred to as contextual intelligence (CI), which 'is the awareness of the interactions between and movement among these agents which, ultimately informs behaviour in a socially complex environment' (Kutz & Bamford-Wade, 2013, p. 67).

Meanwhile, a lot of research acknowledging the relevance of the 'micro-foundations of strategy within international entrepreneurship or international business focuses on the demographic characteristics of decision-makers, such as gender, age, educational background, language skills, or cognitive styles (Elbanna, Child, & Hsieh, 2020; Kiss, Williams, & Houghton, 2013; Maitland & Sammartino, 2015; Shepherd & Rudd, 2014). Some studies investigated the effects of managers' psychological characteristics on decision processes, including the locus of control, need for achievement, risk-taking propensity, proactiveness or global mindset (Elbanna *et al.,* 2020). However, contextual intelligence (CI) has not been examined for its relevance to international entrepreneurship or international business, although its relevance has been prominently acknowledged (Khanna, 2014; Khanna, 2015). In the meantime, it has been reported as an important leadership skill which can be conducive to 'identifying external and internal influences that are not immediately obvious' (Kutz & Stiltner, 2022, p. 2). Kutz and Stiltner (2022) investigated the CI behaviours of athletic trainers practising in the United States of America, with particular attention to differences related to respondent characteristics of the CI behaviours. They found that the most notable difference was athletic trainers with less experience and/or less education reported practising several CI behaviours less than more educated or more experienced respondents. However, there were no differences between males and females. Kutz *et al.* (2017) studied healthcare managers and found, among other things, that female healthcare managers with bachelor's degrees reported practice of four CI behaviours more frequently than those with some college/technical training, and in three cases those with masters' degrees more frequently than those with some college/technical training. However, the results with regard to age and education differed for specific dimensions, with no consistent patterns which could be generalised.

Given the aforesaid paucity of research considering decision-maker characteristics of particular relevance, especially in the VUCA environment, in the current exploratory article, we aim to:

- delineate the practice frequency of CI by medical affairs (MA) professionals operating in a complex and dynamic contextual environment;
- describe differences according to respondent characteristics to explore the antecedents to CI behaviours.

We address these objectives in the empirical context of MA professionals from the pharmaceutical/biotech industry whose role is to co-operate and communicate with healthcare professionals (HCP). The definition of 'health' that we use is a social construct described by the World Health Organisation (WHO) as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO, 1946). This is clearly a complex and contextual definition given that we are all unique due to the genetic heterogeneity of the human race, which while being an ally in the ongoing and omnipresent struggle against pathogens, makes medical or clinical decision-making more complex. In this context, the predominantly positivist approach of scientific realism may be challenged in conditions of making healthcare decisions requiring extrapolation of study data for example due to study design which may lead to ambiguity or uncertainty. An interpretivist approach may be more conceptually suited to dealing with data interpretation and discussive communications around

further understanding and application in healthcare decision-making and the development of perspectives required for the extrapolation of study results to inform individual healthcare decisions. Thus, in reality, it is important to emphasise interpersonal and communication skills which could further enhance MA communications with HCPs regarding the translation of scientific research aimed at explaining, discussing, and understanding how this may apply to healthcare decisions and bring relevant feedback on insights from HCPs which companies may act on.

The paper is structured as follows. We will first present the concept of CI and discuss its different applications. Subsequently, we will elaborate on the methodology of our exploratory study and on Kutz's (2017) operationalisation of CI. We will then present our empirical findings and finally, we will discuss their relevance for international business and entrepreneurship.

LITERATURE REVIEW

Contextual intelligence was described by Sternberg (1985) under the concept of practical intelligence, where context-competent individuals showed abilities to easily fit into new surroundings, adapt to the surroundings and be able to manage the surroundings as appropriate which he classified as a contextual sub-theory of intelligence (Sternberg, 1985, p. 45). This concept was further distilled by Terenzini (1993). Given the advances in IT, the growing pace of internationalisation, and the pursuit of increased decision-making effectiveness, Terenzini (1993) implies that there are three forms of personal competence required besides organisational understanding:

− Tier 1 – Technical/Analytical Intelligence;
− Tier 2 – Issues Intelligence;
− Tier 3 – Contextual Intelligence (CI).

Tier 1 appears to be related to a cognitive construct, given that it relates to factual knowledge/information and analytical and methodological competencies and skills for modelling, which may be taken to represent the intelligence quotient (IQ). Tier 2 relates to generic and generalisable organisational and interpersonal skills which are necessary to function effectively which, for modelling, may be aligned with emotional intelligence (EQ). The author proposes that Tier 1 intelligence precedes Tier 2 intelligence.

Tier 3, or, the 'crowning form,' represents the experiential knowledge or wisdom attributes with the other foundational Tiers to facilitate real people taking actual decisions by individuals who earn themselves legitimacy, trust, and respect based on their profiles.

This aspect of decision-making or formulation and implementation of an action plan is further described by Motamedi (2018) as 'contextual competence' which he describes as comprising the hybridisation of CI and development of an action plan.

Khanna (Khanna, 2014; Khanna, 2015) described CI as the ability to understand the limits of our knowledge and to adapt that knowledge to a context different from the one in which it was developed, which may be interpreted as a feature of being able to deal with complexity by applying a concept which appears to be an experiential or tacit knowledge or a feature of an individual showing an ability somewhat similar to experiential innervation. In his publication in 2014 (Khanna, 2014), he also stresses the need for managers to develop experience or knowledge of local context from their own perspective rather than relying on conventional market research.

Khanna (Khanna, 2014) published his perspective on the relationship between theory learned in business schools and practice, noting that many people then overestimate the role of such theory when looking to succeed in international business and entrepreneurship due to differing conditions which exist and are difficult to codify. He further cites the lack of CI as being a contributor to high failure rates regarding cross-border businesses whereas having knowledge of success in a country may not be a significant factor to predict business success in other countries.

It is clear that in some aspects of life, knowing facts and deciding in certain scenarios or areas of life is very easy but in the field of international business and entrepreneurship or discussions around health the context is complex, and we need to understand the limits of our knowledge. With this in

mind, being able to call on and apply CI is a universally important skill when dealing with VUCA conditions and this includes situations when there may be several 'right answers,' but CI will seek to identify and focus on the best answer or option to implement (Kutz, 2017, p. 14).

Kutz and Bamford-Wade (2013) reported that CI is a model which facilitates leadership and improvement of performance in complex, transforming environments which according to Knight *et al*. (1997) represents a better predictor than IQ in real-life scenarios. Noteworthy, CI is differentiated from emotional intelligence (EQ) through the application of good judgement and intuitive insights especially in the environment of non-linear relationships (Kutz & Bamford-Wade, 2013; Nye, 2008).

While the concept of CI was previously published, Kutz identified specific behaviours related to it (Kutz, 2017; Kutz & Bamford-Wade, 2013). The contextual intelligence framework is a circumplex based on 12 behaviours organised around three time-orientations (*i.e.* Hindsight, Insight, and Foresight), called 3D thinking, which in turn are grouped according to three meta-skills (Complexity Thinking, Synchronicity, and Tacit Awareness) (Kutz, 2017; Kutz & Bamford-Wade, 2013). This operationalisation of CI will be used in our exploratory study described in the ensuing sections.

With regard to medical education, there is a major challenge to academic constructs related to the clinical practice of systems thinking at the level of an individual patient which may lead to challenges when working with complex scenarios where benefit may be achieved through deviation from mechanistic guidelines (Paes, 2019). These mechanistic guidelines do of course have validity in certain non-complex scenarios but there is also a need to be able to act in a non-linear fashion when appropriate. Overall, this interface between theory and practice does raise questions about the level or balance of educational attainment required for particular roles versus experience. Especially, when these may not be major actors in the final decision-making. This is of course a major area of differentiation between medicine and IB given that even after discussion of certain treatments with a physician the patient may still decline treatment, whereas in business the actions are more controlled and implemented based on the decisions taken.

Despite recent evidence supporting females attaining higher grades in school subjects, we still see evidence of under-representation for females in STEM subjects (Science, Technology, Engineering, and Mathematics) which the authors report as being multifactorial (Verdugo-Castro *et al*., 2022). Given this scenario, a vital research question arises as to the profiles of CI in females compared to males in light of the hybridisation required to effectively implement praxis in the fields of complex decision-making requirements. Thus far, only Kutz *et al.* (2017) investigated differences in CI of females with different levels of education, while Kutz and Stiltner (2022) looked into differences between education level, experience level, and the number of credentials. We followed these research efforts in the context of the pharmaceutical/biotech sector to address the research questions of how CI behaviours differ between:

RQ1: gender;

RQ2: age;

RQ3: education level;

RQ4: area of study (*related to the context,* i.e. *medical and healthcare, or unrelated*).

RESEARCH METHODOLOGY

Empirical Setting and Data Collection

One response to engage and support healthcare decision-making by HCPs in healthcare industries from the pharmaceutical, biotech, and medical device sectors has been to develop and implement a medical affairs (MA) function which has a major role in communicating scientific or medical information to and from HCPs in a fair, balanced, and scientifically accurate framework. Core requirements for roles in MA are usually to hold an advanced degree and have the ability to show strong interpersonal skills and be able to communicate scientific and technical data effectively (Theron *et al.*, 2021). Typical qualifications for these roles include physicians, pharmacists, and MSc- or PhD-level scientists; other profiles supplementary to medicine may also be considered.

Training for these roles is usually delivered by the employing company and covers disease area and therapeutics, compliance including pharmacovigilance, company product training, and any additional legal/regulatory or company standard operating procedures required to perform the defined role they are employed to do. There is currently no additional required certification for roles in MA apart from those covered under typical qualifications.

The MA function is a hybrid department which includes both face-to-face functional roles (usually field-based as medical science liaisons (MSL), or hybrid including head office/field-based roles) or non-HCP facing roles which includes the Medical Information (MI) service.

The challenges of engaging with HCPs in order to communicate scientific or medical data dictate that soft/human skills would also play a very important part, especially when engaging in face-to-face or virtual encounters with HCPs. These skills may also improve opportunities for further career development in a corporate and/or internationally mobile profession within MA function and life.

A non-experimental descriptive survey of MA professionals' self-reported behaviours was conducted utilising a cohort based on a sample of LinkedIn networked professionals from the pharmaceutical and biotech sectors. The survey was targeted mainly at MA professionals. However, some responses were collected from medical, commercial, global marketing, or medical communications functions depending on the respondents' description of responsibilities which may differ across organisations. The data collection took place in October 2021 and resulted in an effective sample size of N=51. The objective of the convenience sampling was to account for the role of such respondent characteristics as gender, age, and the level and field of education. The distribution of these characteristics is provided in Table 1.

Table 1. Characteristics of the respondents

Characteristics	N (%)
Gender (N=51)	
Female	22 (43)
Male	29 (57)
Age range (yrs)	
25-34	8 (16)
35-44	9 (18)
45-54	22 (43)
55-64	12 (24)
Highest level of academic qualification obtained	
Bachelor's degree	1 (2)
Master's degree	20 (39)
Doctorate	30 (59)
Field of highest educational attainment	
Business	1 (2)
Healthcare	13 (25)
Medicine	13 (25)
Pharmacy	5 (10)
Science	19 (37)
Current role function	
Commercial	1 (2)
Medical	11 (22)
Medical Affairs	37 (73)
Other	
Global Marketing	1 (2)
Medical Communications	1 (2)

Source: own elaboration of the survey data.

Data Operationalisation

The Contextual Intelligence Profile (CIP™) tool used had content validity established in a previous publication (Kutz *et al.*, 2017) and was developed by Matthew Kutz, who represents his framework for CI as a circumplex representing three meta-skills described as complexity thinking, synchronicity, and tacit awareness related to time-oriented descriptors of foresight (the ability to articulate a realistic plan for an ideal future), hindsight (the ability to use past experiences to their full advantage), and insight (the ability to understand what influences the present moment) which he further describes as 3D thinking and these are further defined through 12 CI behaviours aligning four behaviours per 3D thinking descriptor (Kutz, 2017). Kutz originally identified the 12 CI behaviours following a series of research projects which focused on identifying important leadership behaviours regardless of industry, job, or rank in an organization (Kutz, 2017). He describes CI as 'the ability to demonstrate the skill to discern, transition between, and respond to many different contexts' (Kutz, 2017, p. 31).

Moreover, the 12 behaviours comprise CI when they are practised en-masse as it is the sum of these parts and not individual behaviours which demonstrate CI in practice (Kutz, 2017, p. 37–50). The details of the measurement instrument are provided in Table 2.

Table 2. CI behaviours' conceptual framework

3D thinking dimension	CI behaviour	CI description
Foresight	Diagnoses context	Awareness and understanding of the environment related to people and surroundings related to how they may influence each other.
	Change agent	Ability to ask or raise difficult or challenging questions to introduce or do things differently through readily supporting with full confidence, highlighting the danger of not changing and also having an open mind for further continuous improvements.
	Future-minded	Ability and self-awareness as to when they can see and communicate a clear plan aimed at overcoming obstacles and/or contradictions which may of course change as well as when to consult others to help fill any gaps in the plan(s).
	Intentional leadership	A keen self-awareness of leadership style and personal preferences in order to learn and adopt additional appropriate leadership styles in advance of being required.
Hindsight	Constructive use of influence	Accurate interpretation based on previous experience of which power (legitimate, expert, referent, coercive, reward) is likely to be most effective with certain individuals and/or situations.
	Critical thinker	A high degree of self-awareness to recognise limitations and bias in their perspectives but readily embrace complexity and new ideas through critical analysis of the past and the ability to innervate experiences.
	Influencer	Differentiated from 'constructive use of influence' focusing on the use of interpersonal skills, previous success and empathy to communicate your perspective and building rapport to enable/inform awareness of whether the message is received.
	Consensus builder	Aligning people with different perspectives and/or competing values around a collaborative solution through the appropriate use of questions and harmonising the different perspectives into a good-faith effort.
Insight	Communitarian	A personal trait which is focused on active support for a community and the connection or interactions between self and the community with which you may identify with based on deeply-held beliefs.
	Mission minded	Alignment with corporate equity and reputation with a heightened awareness of how the performance and actions of self and/or others may affect perceptions of the employing organisation.
	Appreciates diverse ideas	Demonstrating courage to listen to alternative or additional ideas of people who may have different perspectives to yours in a sincere way which builds respect even in an environment of disagreement, conflicting, or different ideas.
	Multicultural leadership	A leadership trait which demonstrates empathy to try to understand differences in cultures, gender and ethnicity in a demonstration of authenticity, humility and appreciation that context matters.

Source: own elaboration based on Kutz (2017).

To address the research objectives formulated at the outset, we conducted statistical analyses using the IBM SPSS Statistics version 25 package. Using this tool, Spearman's rho correlation analysis and Student's t-tests as well as a two-stage cluster analysis were performed. The classic threshold $\alpha = 0.05$ was adopted as the level of statistical significance. Prior to conducting all analyses, the data set was analysed for missing values, revealing that they were random. Thus, stochastic regression imputation (simple imputation) was used.

To prepare the data for analysis, first, the distributions of all variables were verified. Basic descriptive statistics were calculated together with the Shapiro-Wilk test. Due to the presence of outliers exceeding the third standard deviation, they were removed and replaced with the next closest values in the set. The results of the analysis are presented in Table 3 for the main dimensions of the CI tool and the specific behaviours, respectively.

Table 3. Descriptive statistics with the Shapiro-Wilk test

Variables	M	Me	SD	Sk.	Kurt.	Min.	Max.	W	p
Hindsight	65.82	68.00	11.44	-0.47	0.47	31.00	88.00	0.98	0.514
Foresight	65.67	67.00	11.77	-0.27	-0.50	39.00	90.00	0.98	0.551
Insight	64.04	66.00	11.79	-0.98	1.08	29.00	83.00	0.94	0.010
Communitarian	13.59	14.00	4.35	-0.49	-0.86	4.00	20.00	0.94	0.008
Diagnoses Context	16.94	18.00	3.46	-0.65	-0.23	8.00	22.00	0.94	0.018
Consensus Builder	15.94	16.00	3.23	-0.55	0.48	7.00	23.00	0.97	0.146
Mission Minded	14.77	15.00	4.11	-0.59	-0.19	5.00	22.00	0.96	0.066
Embraces Diverse Ideas	17.37	17.00	3.61	-0.27	-0.66	9.00	24.00	0.97	0.181
Influencer	16.86	18.00	3.27	-0.17	-0.31	10.00	24.00	0.97	0.319
Critical Thinker	16.94	17.00	3.02	-0.38	0.48	9.00	23.00	0.97	0.251
Multicultural Leadership	18.47	19.00	3.19	-0.52	-0.08	10.00	24.00	0.96	0.125
Future Minded	16.82	17.00	3.29	-0.25	-0.71	10.00	23.00	0.97	0.144
Change Agent	15.90	16.00	3.76	-0.27	-0.33	7.00	24.00	0.97	0.265
Intentional Leadership	16.00	16.00	3.92	-0.53	0.42	4.00	23.00	0.97	0.208
Constructive Influence	16.24	17.00	3.43	-0.45	0.06	6.00	22.00	0.96	0.082

Source: own elaboration of the survey data.

The distribution normality tests showed that the distributions of most variables were close to the Gaussian curve. Only the Communitarian and Diagnoses Context indicators of CI were distant from the normal distribution ($p < 0.05$). However, the skews did not exceed the absolute value of 1. This indicates a distribution with a slight level of asymmetry. Therefore, the ensuing analyses were based on parametric tests.

RESULTS AND DISCUSSION

Relationships Between Contextual Intelligence and Sociodemographic Variables

To explore how sociodemographic variables are related to CI, both a series of Student's t-tests for independent samples and an analysis of Spearman's rho correlation were performed, whereby gender differences were tested first. The conducted Student's t-test for independent samples revealed no statistically significant effects. This means that gender did not appear to differentiate the level of CI, neither for the main dimensions nor for specific behaviours (Table 4).

Subsequently, the analyses of Spearman's rho correlation between age and indicators of CI were performed. Table 5 presents the results of this analysis. The analysis showed that age was only related to the contextual intelligence behaviour of Future Minded. The relationship was negative and moderate. It follows that the older the respondents were, the lower the intensity of this CI behaviour among them. The other correlations were statistically insignificant.

In the next step, it was verified whether the level of education differentiates the intensity of behaviour related to contextual intelligence. Bachelor's education (n = 1) and graduate education (n = 20) were combined for the analyses. Student's t-tests were performed again for independent samples (Table 6).

Table 4. Gender differences in CI

Variables	Male (n = 29)		Female (n = 22)		t	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Hindsight	65.03	12.85	66.86	9.46	-0.56	0.577	-8.38	4.72	0.16
Foresight	65.65	12.50	65.68	11.03	-0.01	0.993	-6.78	6.73	0.00
Insight	63.45	13.68	64.82	8.97	-0.41	0.686	-8.12	5.39	0.12
Communitarian	13.24	4.83	14.05	3.68	-0.67	0.503	-3.20	1.59	0.18
Diagnoses Context	16.76	3.65	17.18	3.25	-0.43	0.668	-2.40	1.56	0.12
Consensus Builder	15.86	3.46	16.09	2.83	-0.25	0.802	-2.05	1.59	0.07
Mission Minded	15.00	4.04	14.45	4.26	0.47	0.643	-1.81	2.90	0.13
Embraces Diverse Ideas	17.45	3.94	17.27	3.21	0.17	0.865	-1.90	2.25	0.05
Influencer	16.72	3.56	17.05	2.90	-0.34	0.732	-2.19	1.55	0.10
Critical Thinker	16.90	3.45	17.00	2.43	-0.13	0.901	-1.76	1.55	0.03
Multicultural Leadership	18.03	3.52	19.05	2.66	-1.12	0.267	-2.82	0.80	0.32
Future Minded	17.07	3.52	16.50	3.00	0.61	0.546	-1.31	2.45	0.17
Change Agent	16.34	3.83	15.32	3.68	0.96	0.340	-1.11	3.17	0.27
Intentional Leadership	15.48	4.32	16.68	3.29	-1.08	0.284	-3.42	1.02	0.31
Constructive Influence	15.79	3.58	16.82	3.20	-1.06	0.295	-2.97	0.92	0.30

Source: own elaboration of the survey data.

Table 5. Age differences in CI

Variables	Statistics	Age
Hindsight	Spearman's rho	-0.14
	significance	0.317
Foresight	Spearman's rho	-0.17
	significance	0.244
Insight	Spearman's rho	-0.12
	significance	0.412
Communitarian	Spearman's rho	-0.05
	significance	0.703
Diagnoses Context	Spearman's rho	-0.08
	significance	0.570
Consensus Builder	Spearman's rho	-0.10
	significance	0.469
Mission Minded	Spearman's rho	-0.19
	significance	0.192
Embraces Diverse Ideas	Spearman's rho	-0.11
	significance	0.428
Influencer	Spearman's rho	-0.12
	significance	0.391
Critical Thinker	Spearman's rho	-0.11
	significance	0.457
Multicultural Leadership	Spearman's rho	-0.06
	significance	0.676
Future Minded	Spearman's rho	**-0.30**
	significance	**0.031**
Change Agent	Spearman's rho	-0.01
	significance	0.951
Intentional Leadership	Spearman's rho	-0.13
	significance	0.358
Constructive Influence	Spearman's rho	-0.10
	significance	0.488

Source: own elaboration of the survey data.

Table 6. Differences in CI dimensions depending on the level of education

Variables	Bachelor's & master Degree (*n* = 21)		Doctorate (*n* = 30)		*t*	*p*	95% CI		Cohen's *d*
	M	*SD*	*M*	*SD*			*LL*	*UL*	
Hindsight	67.38	10.32	64.73	12.22	0.81	0.422	-3.92	9.21	0.23
Foresight	66.19	10.95	65.30	12.49	0.26	0.793	-5.90	7.69	0.08
Insight	62.67	8.21	66.27	11.14	-1.26	0.214	-9.35	2.14	0.36
Communitarian	11.33	3.92	15.17	3.97	-3.41	**0.001**	-6.09	-1.57	0.97
Diagnoses Context	16.57	3.30	17.20	3.60	-0.63	0.529	-2.62	1.36	0.18
Consensus Builder	16.38	2.82	15.63	3.50	0.81	0.421	-1.10	2.60	0.23
Mission Minded	14.57	4.25	14.90	4.07	-0.28	0.781	-2.70	2.04	0.08
Embraces Diverse Ideas	17.43	3.44	17.33	3.78	0.09	0.927	-1.99	2.18	0.03
Influencer	17.57	3.38	16.37	3.15	1.30	0.198	-0.65	3.06	0.37
Critical Thinker	16.33	3.14	17.37	2.92	-1.21	0.233	-2.75	0.69	0.34
Multicultural Leadership	18.10	3.13	18.73	3.26	-0.70	0.488	-2.47	1.20	0.20
Future Minded	16.90	3.42	16.77	3.26	0.15	0.884	-1.76	2.04	0.04
Change Agent	16.24	3.75	15.67	3.82	0.53	0.599	-1.60	2.74	0.15
Intentional Leadership	16.48	2.79	15.67	4.57	0.78	0.437	-1.26	2.88	0.21
Constructive Influence	17.10	3.03	15.63	3.61	1.52	0.135	-0.47	3.40	0.43

Source: own elaboration of the survey data.

Only the communitarian index showed clear differences. The recorded effect was very powerful. Comparing the means, respondents with doctorate education were characterised by a higher level of Communitarian behaviours than those with lower educational attainment. The remaining indicators of CI were not differentiated by the education of the respondents.

Finally, we verified whether there were differences in the behaviour of CI depending on the field in which the respondents completed their education. For our analyses, the fields of medicine (n = 13) and health care (n = 13) were combined into one group and compared with the fields of science or other fields: economics (n = 1), pharmacy (n = 5), and science (n = 19). The results of the Student's t-tests for independent samples turned out to be statistically insignificant for each variable. This means that medical subjects did not differ from research subjects in terms of CI (Table 7).

Table 7. Differences in CI dimensions depending on the scientific area

Variables	Medicine & healthcare (*n* = 26)		Science & other (*n* = 25)		*t*	*p*	95% CI		Cohen's *d*
	M	*SD*	*M*	*SD*			*LL*	*UL*	
Hindsight	64.96	11.92	66.72	11.09	-0.54	0.588	-8.25	4.73	0.15
Foresight	66.15	12.38	65.16	11.34	0.30	0.766	-5.69	7.68	0.08
Insight	62.92	13.54	65.20	9.80	-0.69	0.496	-8.95	4.40	0.19
Communitarian	13.54	4.82	13.64	3.90	-0.08	0.935	-2.58	2.37	0.02
Diagnoses Context	16.88	3.23	17.00	3.74	-0.12	0.908	-2.08	1.85	0.03
Consensus Builder	16.00	3.73	15.88	2.68	0.13	0.896	-1.71	1.95	0.04
Mission Minded	14.73	3.83	14.80	4.45	-0.06	0.954	-2.40	2.27	0.02
Embraces Diverse Ideas	16.65	3.84	18.12	3.27	-1.47	0.149	-3.48	0.54	0.41
Influencer	16.65	2.78	17.08	3.75	-0.46	0.648	-2.30	1.44	0.13
Critical Thinker	17.04	3.03	16.84	3.08	0.23	0.817	-1.52	1.92	0.07
Multicultural Leadership	18.31	3.39	18.64	3.03	-0.37	0.714	-2.14	1.48	0.10
Future Minded	16.69	3.22	16.96	3.42	-0.29	0.775	-2.14	1.60	0.08
Change Agent	16.42	3.47	15.36	4.05	1.01	0.318	-1.06	3.18	0.28
Intentional Leadership	16.15	4.46	15.84	3.35	0.28	0.778	-1.91	2.54	0.08
Constructive Influence	15.58	3.25	16.92	3.53	-1.41	0.164	-3.25	0.57	0.40

Source: own elaboration of the survey data.

Cluster Analysis of CI

To classify the groups from the studied sample in terms of their sociodemographic variables and the behaviour of CI, a two-stage cluster analysis was performed. The analyses included gender, education, and all indicators of CI. The analysis was set up to distinguish three clusters. The Shilouette measure was 0.3, which indicates the correctness of group separation. The three cluster groups were evenly distributed: n = 17, 33.3%. Figure 1 shows the distribution of these clusters.

In the first cluster, people with a relatively low level of CI behaviours were identified. Most of them were men with doctoral degrees. The second group included people with a high level of CI. They were also men who completed their education with a doctoral degree. The third cluster included people with a relatively moderate level of CI. They were mainly women with bachelor's or master's degree. Table 8 provides detailed information on the prediction coefficients and the percentages of the factors.

Table 8. Cluster characteristics extracted from the analysis in the studied sample

Predictors	Predictor relevance	Cluster 1 (*n* = 17; 33.3%)	Cluster 2 (*n* = 17; 33.3%)	Cluster 3 (*n* = 17; 33.3%)
Intentional Leadership	1.00	11.94	19.29	16.76
Constructive Influence	0.90	12.71	18.82	17.18
Education	0.79	Doctorate (88.2%)	Doctorate (88.2%)	Bachelor & Master Degree (100%)
Influencer	0.78	13.65	19.18	17.76
Diagnoses Context	0.65	14.17	19.88	16.76
Consensus Builder	0.52	13.35	18.24	16.24
Mission Minded	0.51	11.59	17.76	14.94
Critical Thinker	0.49	15.00	19.41	16.41
Future Minded	0.46	14.41	19.18	16.88
Change Agent	0.33	13.47	18.24	16.00
Embraces Diverse Ideas	0.24	15.42	19.12	17.76
Multicultural Leadership	0.23	16.82	20.24	18.35
Communitarian	0.21	13.29	16.00	11.47
Sex	0.07	Male (70.6%)	Male (58.8%)	Female (58.8%)

Source: own elaboration of the survey data.

To summarise, our study provides a novel empirical contribution to the concept of CI through an exploratory study of MA professionals and their CI behaviour while taking into account several individual-level characteristics. It is interesting to observe the similarity observed between this group and female hospital managers (Kutz *et al.*, 2017) where 'communitarian' is reported as the lowest mean behaviour for both groups as well as showing statistically significant differences based on educational attainment comparing bachelor's/master's degrees versus doctorates (p = 0.001). This may require further research, especially when looked at from the perspective of Maslow's sixth tier of self-transcendence (Venter, 2017) in which Maslow describes this person as being someone who is freed from a 'dichotomous way of thinking' (Maslow, 1968, p. 180) with potential to have global impact in which they are able to identify and understand different perspectives and not become infatuated with self (Venter, 2017).

The insights from this study can be summarised by regarding the reported frequencies of behaviours in comparison with the *a priori* ranges used in Kutz *et al.* (2017) (Table 9).

Our findings indicate that around 83.3% (10/12) of the CI behaviours were reported to be practised with very high or high frequency with only mission-minded and communitarian being reported as moderate or low respectively, which is where both of these behaviours were reported among US female hospital managers (Kutz *et al.*, 2017).

Table 9. Ranked CI behaviour frequencies (Frequency ranges determined a priori as in Kutz et al., 2017)

Dimension	Mean value	Very High (>= 16.75)	High (15.50-16.74)	Moderate (14.41-15.49)	Low (<=14.40)
Communitarian	13.59				X
Diagnoses Context	16.94	X			
Consensus Builder	15.94		X		
Mission Minded	14.77			X	
Embraces Diverse Ideas	17.37	X			
Influencer	16.86	X			
Critical Thinker	16.94	X			
Multicultural Leadership	18.47	X			
Future Minded	16.82	X			
Change Agent	15.90		X		
Intentional Leadership	16.00		X		
Constructive Influence	16.24		X		

Source: own elaboration of the survey data.

CONCLUSIONS

This peculiar empirical context with its complexity and the relevance of managerial skills pertaining to an understanding, interpretation, and appropriate reaction to the context can be regarded as a proxy for the broader notion of doing business in VUCA environments. Besides interpersonal skills, in roles which are subject to VUCA conditions, the integration of linguistics, cultural awareness, and analytical abilities are important, especially in face-to-face or virtual interactions. Noteworthy, as a concept, CI is very important in complex scenarios for individuals working in organisations as it enables them to appreciate and understand the specific aspects of the organisational culture and dynamics and thus improves the possibility to make better context-based decisions.

Furthermore, CI is important for decisions in the area of international entrepreneurship and business, because it may improve decision-makers' understanding and ability to respond to the unique opportunities and challenges presented by the different scenarios which are likely to be unique with more than one correct answer or option available. Indeed, the international activities of the firm are influenced by the external context, both of the foreign countries where the firm is operating and its home economy, as well as the internal context provided by the characteristics of the organisation itself and its members (Child *et al.*, 2022).

This leads to the realisation that since firm internationalisation is a highly uncertain process and as decision-makers cope differently with the related uncertainty, the issues of cognitive limits, tolerance of risk and uncertainty, and experience are crucial factors determining strategic decisions (Maitland & Sammartino, 2015; Niittymies & Pajunen, 2020). Extant research provides some evidence that these skills are crucial especially if the actors in the decision process have diverse cultural and educational backgrounds and experiences (Kiss *et al.*, 2013). However, while the vital importance of CI as a skill in an international environment has been already underlined (Khanna, 2014; Khanna, 2015), its use as an important individual characteristic of decision-makers which goes beyond the conventionally studied variables, such as age, education, or international experience is yet to take place.

Thus, talent management professionals within pharmaceutical/biotech and medical device and other industries should consider CI as an area which can help to identify and equip people who are more likely to develop as international leaders given the skills required for navigating a VUCA environment in order to make improved or informed career development and/or internationalisation decisions.

This descriptive, exploratory small sample size dataset of MA professionals currently working in the pharmaceutical/biotech environment carries a high risk of bias because of the Likert scale, self-rating perception method, sample selection criteria, and generalisation of results; both in healthcare as well as

other complex environments such as international business. Future studies should consider the alignment of CI and leadership profiles aligned with positivist/interpretivist phenotypes in areas which explore the confirmation of CI as a key skill for complex decision-making in VUCA environments such as healthcare, internationalisation, or portfolio management. Scholars should also consider proposing a model which looks at the hypothetical relationship between IQ, EQ, and CI for personnel development.

In addition to these avenues of exploration, it would be useful to further explore the 3D profiles given the potential importance of hindsight given that many entering roles in MA are likely to be recently qualified and as such, they may hypothetically have clear development requirements in order to communicate more effectively with senior, very experienced healthcare key opinion leaders; the same criteria need to be assessed and applied for people making IB and internationalisation/portfolio decisions. The rationale also supports experience which may illustrate previous success (with the caveat that each decision is likely to be unique) and the potential to implement what we describe as 'experiential innervation' which is the connecting of dots from your experience in different areas/conditions to hybridise a solution, which may also include nonlinear thinking.

To sum up, this exploratory investigational study sought to raise awareness of contextual intelligence and suggest future questions and hypotheses to be explored in future research. It also reported that amongst MA professionals, CI behaviours are reported to be practised with high frequency – further research will be necessary to align and validate these behaviours in relation to role performance and positive outcomes in VUCA decision-making environments such as healthcare and international business.

REFERENCES

Breen, J.M. (2017). Leadership Resilience in a VUCA World. In R. Elkington, M.V.D Steege, J. Glick-Smith, & J.M. Breen (Eds.), *Visionary Leadership in a Turbulent World*. Emerald Publishing Limited.

Child, J. (2009). Context, Comparison, and Methodology in Chinese Management Research. *Management and Organization Review, 5*, 57-73. https://doi.org/10.1111/j.1740-8784.2008.00136.x

Child, J., Karmowska, J., & Shenkar, O. (2022). The role of context in SME internationalization – A review. *Journal of World Business, 57*. https://doi.org/10.1016/j.jwb.2021.101267

Elbanna, S., & Child, J. (2007). Influences on strategic decision effectiveness: Development and test of an integrative model. *Strategic Management Journal, 28*, 431-453. https://doi.org/10.1002/smj.597

Elbanna, S., Hsieh, L., & Child, J. (2020). Contextualizing Internationalization Decision-making Research in SMEs: Towards an Integration of Existing Studies. *European Management Review, 17*, 573-591. https://doi.org/10.1111/emre.12395

Hough, J.R., & White, M.A. (2003). Environmental dynamism and strategic decision-making rationality: an examination at the decision level. *Strategic Management Journal, 24*(5), 481-489. Retrieved from https://www.jstor.org/stable/20060548 on December 16, 2022.

Khanna, T. (2014). Contextual Intelligence. *Harvard Business Review, 92*, 58-68.

Khanna, T. (2015). A Case for Contextual Intelligence. *Management International Review (MIR), 55*(2), 181-190. https://doi.org/10.1007/s11575-015-0241-z

Kiss, A.N., Williams, D.W., & Houghton, S.M. (2013). Risk bias and the link between motivation and new venture post-entry international growth. *International Business Review, 22*(6), 1068-1078. https://doi.org/10.1016/j.ibusrev.2013.02.007

Knight, W.E., Moore, M.E., & Coperthwaite, C.A. (1997). Institutional Research: Knowledge, Skills, and Perceptions of Effectiveness. *Research in Higher Education, 38*, 419-433. https://doi.org/10.1023/A:1024910409653

Kutz, M., & Stiltner, S. (2022). Integration of contextual intelligence by sport medicine clinicians in the United States. *International Journal of Healthcare Management*, 1-10. https://doi.org/10.1080/20479700.2022.2086722

Kutz, M.R. (2017). *Contextual Intelligence – How Thinking in 3D Can Help Resolve Complexity, Uncertainty and Ambiguity*, Springer Nature.

Kutz, M.R., Ball, D.A., & Carroll, G.K. (2017). Contextual intelligence behaviors of female hospital managers in the United States. *International Journal of Healthcare Management, 11*, 155-163. https://doi.org/10.1080/20479700.2017.1309819

Kutz, M.R., & Bamford-Wade, A. (2013). Understanding Contextual Intelligence: A critical competency for today's leaders Emergence: *Complexity & Organization, 15*, 55-80.

Maitland, E., & Sammartino, A. (2015). Managerial cognition and internationalization. *Journal of International Business Studies, 46*, 733-760. https://doi.org/10.1057/jibs.2015.9

Maslow, A.H. (1968). *Toward a psychology of being*. New York: Van Nostrand.

Motamedi, K. (2018). Contextual competence. *International Journal of Business and Management*, *6*(1), 26-35.

Niittymies, A., & Pajunen, K. (2020). Cognitive foundations of firm internationalization: A systematic review and agenda for future research. *International Business Review, 29*, S0969593119309412. https://doi.org/10.1016/j.ibusrev.2019.101654

Nye, J. (2008). *The Powers to Lead*. Oxford University Press.

Paes, P. (2019). Practical wisdom, a dormant character in medical education?. *Medical Education, 53*, 428-429. https://doi.org/10.1111/medu.13832

Reuber, A.R., Dimitratos, P., & Kuivalainen, O. (2017). Beyond categorization: New directions for theory development about entrepreneurial internationalization. *Journal of International Business Studies, 48*(4), 411-422. https://doi.org/10.1057/s41267-017-0070-3

Sarkar, A. (2016). We live in a VUCA World: the importance of responsible leadership. *Development and Learning in Organizations: An International Journal, 30*, 9-12. https://doi.org/10.1108/DLO-07-2015-0062

Shapiro, D.L., Von Glinow, M.A., & Xiao, Z. (2007). Toward Polycontextually Sensitive Research Methods. *Management and Organization Review, 3*, 129-152. https://doi.org/10.1111/j.1740-8784.2007.00058.x

Shepherd, N.G., & Rudd, J.M. (2014). The Influence of Context on the Strategic Decision-Making Process: A Review of the Literature. *International Journal of Management Reviews, 16,* 340-364. https://doi.org/10.1111/ijmr.12023

Sternberg, R.J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. Cambridge University Press.

Teagarden, M.B., Von Glinow, M.A., & Mellahi, K. (2018). Contextualizing international business research: Enhancing rigor and relevance. *Journal of World Business, 53*(3), 303-306. https://doi.org/10.1016/j.jwb.2017.09.001

Terenzini, P.T. (1993). On the nature of institutional research and the knowledge and skills it requires. *Research in Higher Education, 34*, 1-10. https://doi.org/10.1007/BF00991859

Theron, P., Britland, M., Holder, D., Ikeda, Y., Rewers, R.F., & Tiku, A. (2021). Promoting Best Practices for Medical Science Liaisons Position Statement from the APPA, IFAPP, MAPS and MSLS. *Therapeutic Innovation & Regulatory Science, 55*, 1139-1144. https://doi.org/10.1007/s43441-021-00310-y

Venter, H. (2017). Self-Transcendence: Maslow's Answer to Cultural Closeness. *Journal of Innovation Management, 4*(4). https://doi.org/10.24840/2183-0606_004.004_0002

Verdugo-Castro, S., Sánchez-Gómez, M. C., & García-Holgado, A. (2022). University students' views regarding gender in STEM studies: Design and validation of an instrument. *Education and Information Technologies, 27*, 12301-12336. https://doi.org/10.1007/s10639-022-11110-8

WHO (1946). Constitution. Retrieved from https://www.who.int/about/governance/constitution on December 16, 2022.

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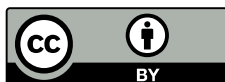
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