



DIY Entrepreneurship: a decision-pathway framework for ethical thought structures



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ABSTRACT

This conceptual paper provides a decision-making framework that enhances our understanding of how Do-It-Yourself (DIY) laboratory entrepreneurs execute ethical standards by dismissing fraud. Although our theory assumes that most DIY entrepreneurs are by nature 'ethical', we discuss how the unique nature of DIY laboratory entrepreneurship provides risks for fraud. Drawing on three ethical theoretical lenses, utilitarianism, deontology and egoism, our paper proposes different potential causes of fraud and motivates further analysis about why DIY laboratory entrepreneurship is an important context for the study of fraud. We contribute to theory and government policy by providing a conceptual framework that explains how entrepreneurial choices lead to three main types of fraud based on the dominant decision pathways. Further research and practical implications are discussed.

1. Introduction

The emergence of a DIY science movement has become a widely discussed issue in the academic and policy circles. Do it yourself (DIY) refers to the "making" and "crafting" associated with the spread of hobbyism as a social practice (Gelber, 1999). Chen and Wu (2007a) also describe DIY entrepreneurship as the "maker movement". Whilst DIY laboratory entrepreneurship continues to enjoy increasing support from government and its diffusion into official research streams has been promising (Sarpong et al., 2020), other social actors seem to perceive DIY entrepreneurs in different ways due to issues regarding the consistency of their work, and more crucially, ethical misgivings due to fraud (Ferretti, 2019). Gannon (2007) cites fraud as a depressing theme that seems to emerge from scientific and DIY laboratories. Vasu et al. (2003) also confirm fraud to be the besetting evil of our time.

This paper's primary ethical framework is motivated because DIY entrepreneurs' ethics are essential when advancing their craft in the business world. Even though there may be an inclination to distort the ethical records of their craft in certain situations, this will ultimately harm the general perception of DIY entrepreneurship. Thus, whilst some decisions may improve financial information in the short term,

unethical tactics will ultimately lead to entrepreneurs' downfall (Rodgers et al., 2014; Sarpong et al., 2020; Sarpong and Rawal, 2020). Besides, being able to delegate and trust people to perform their duties is another key element of DIY entrepreneurs' ethical considerations. Hence, it is essential to trust others as well as obtaining a good understanding of employing an ethical framework.

In other words, employees make better decisions in less time with ethics as a piloting principle (Rodgers, 2009). And, this increases productivity and overall employee morale. When employees complete work in a way that is grounded on honesty and integrity, the entire organisation benefits. Moreover, untarnished entrepreneurial ethics assist in developing relationships erected on mutual trust and respect. Without this trust, an organisation's fraud level may increase, and investments may diminish (Sarpong et al., 2020; Chevassus-au-Lois, 2019; Rodgers et al., 2014). In reducing fraud, successful DIY entrepreneurs can gain credibility and reliance as a result of their sound ethical entrepreneurial practices.

Specifically, 'fraud' in Do-It-Yourself (DIY) laboratories occurs when entrepreneurs intentionally execute activities of self-interest through deception, omission or perversion against the law. According to Chevassus-au-Lois (2019), DIY laboratory fraud presents ubiquitous risk

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with significant impact on much of society due to the decline in scientific rigour. For example, in social entrepreneurship, individuals may engage in self-interested pursuits stemming from institutional emergent patterns that are distinguished by their discourses, narrative logic, and the ideal type of organisation models (Nicholls, 2010). Further, impression management suggests that individuals may, in a biased manner, attempt to influence the perceptions of other individuals regarding a person, place, or thing by regulating and controlling information in social interaction (Leary and Kowalski, 1990; Nagy, et al., 2012; Rutherford et al., 2009; Johansson et al., 2019; Shepherd et al., 2020).

The Association of Certified Fraud Examiners, for instance, has for a long time pointed out the level of fraud for entrepreneurs as significant (Bierstaker et al., 2006). Unfortunately, fraud in DIY entrepreneurship has been generally overlooked. The entrepreneurship literature does not offer any guidance about fraud and how it can be manifested, nor does it provide any explanatory frameworks to understand the mechanisms behind fraud (Brenkert, 2009). To our knowledge, there have been only a few studies examining fraud in entrepreneurship (Bucar et al., 2003; Kellermanns et al., 2012; Sarasvathy et al., 1998; Wexler, 2016). These studies deal with ethics and attitude in general without amplification of the cause of fraud or how to fight fraud. The objective of this conceptual research paper is to develop and define what fraud implies and why it emerges in DIY entrepreneurial entities. Following the work of Simon and Houghton (2002, p. 106), we argue that *“to understand entrepreneurship, one must understand the entrepreneur”*. In doing so we, therefore, present a conceptual model that both conceptualises and contextualises three main types of fraud and entrepreneurial decision pathways behind a fraud decision. Specifically, we integrate Cressey's (1950) fraud risk theory with the literature on ethical decision-making and research on overall ethical pathways that categorise individuals as principle-based (utilitarianism), rule-based (deontological) and preference-based (ethical egoism). In addition to serving as a basis for future research about DIY entrepreneurial behaviour in general and fraud specifically, the study is a response to calls for a better explanation of the moral legitimacy of entrepreneurship (Rutherford et al., 2009; Olaison & Sørensen, 2014; Kaptein, 2019; Dalpiatz and Cavotta, 2019).

2. Theoretical perspectives on fraud in DIY entrepreneurship

2.1. Fraud risks and decision pathways

Bressler and Bressler (2007) see fraud as intentional deception made for personal gain or to damage, and as a criminal and civil law violation. In their view, fraud in entrepreneurship is attached to situations where entrepreneurs act opportunistically to seek self-interest through benefiting at the expense of others, copy computer programs, use illegal copies of software for cost-cutting, or avoid taxes and carry out insider trading in the establishment of the venture (Longenecker et al., 1989; Dunfee et al., 1991; Zhang et al., 2009). In a related study, Brenkert, (2009) presented the mythological images of successful entrepreneurs as tricksters, sly persons who succeed just because of their thriving in the grey zone of devious acts. Intriguingly, Fadahunsi and Rosa (2002, p.399) introduced the entrepreneurial image as *“a person sailing close to the wind, constantly testing the boundaries of what is permissible, bending the rules, and exploiting any ambiguity in the law”*. However, although uncertainty, ownership, money and access to resources could influence an entrepreneur's ability to make decisions that lead to committing a fraudulent act, there is not much evidence to suggest that entrepreneurs by definition are imbued with traits that make them vulnerable to engage in fraud. Instead, there is much pointing to the fact that it is a naïve stereotype and that the study of fraud in entrepreneurship should be executed from alternative perspectives to a trait-based approach.

As a result of these antecedents, behavioural scientists have been

unable to identify a psychological trait that offers a valid and reliable indicator of the propensity of an individual to commit fraud (see Duffield and Grabosky, 2001). This paper, therefore, asserts that there is no reason to deviate from that assumption when it comes to entrepreneurs. Although their role and professional engagement make them less influenced by others in their decision-making, this is no support for assuming they would be less ethical persons and also possess the natural tendency to commit fraud. In view of these factors, Krueger (2000) asserts that the propensity to commit fraud is based on risk factors. Hence, in following this argument, one could confidently depart from the cognitive approach by focusing on the entrepreneur's construction of ways of collecting, processing, and evaluating information based on ‘entrepreneurial opportunity’ (Allinson et al., 2000; Malmström et al., 2015; Palich and Bagby, 1995) whereby perception and other cognitive phenomena are critical in the evaluation of fraudulent behaviours. Studying the entrepreneurs, cognition can contribute to the literature of fraud behaviour in entrepreneurship by showing how individuals process information that in turn affects their decision to commit fraud.

In following this distinct line of argument, we apply Cressey's fraud risk theory (1950) as an initial base in our framework for conceptualising risk factors for entrepreneurs. We specifically outline the key constructs by identifying the triggers of fraud. We also provide an explanation of the processes DIY entrepreneurs go through in rationalising fraudulent activities in their decision-making. In addition, following what is sometimes known as the fraud triangle, we propose that there are contextual triggers of pressure (incentive) defined as personal financial conditions that motivate an entrepreneur to commit fraud (e.g., inability to pay bills, drug or gambling addiction, need to meet productivity targets with venturing and desire to gain higher standards of living). Moreover, the opportunity for committing fraud (pre-fraud) and behaviour for rationalisation of fraud (pre/post-fraud), which is the manner in which the individual entrepreneur justifies their behaviour and ‘overcomes the feelings of guilt’ by considering himself or herself to be an ordinary, honest person who is the victim of unfair treatment.

3. Defining a throughput Model for decision-making in DIY fraud

We conceptualise cognition in entrepreneurial fraud behaviour by identifying a decision Throughput Model for further elaborating on ethical pathways which explain the fraudulent behaviour of DIY entrepreneurs. We use the model for clarifying the critical cognitive pathways for decision-making on fraud behaviours (Rodgers, 2007). In our framework, we specify the Throughput Model into three distinct identified pathways that provide a greater understanding of how different types of entrepreneurs rationalise fraud and how this knowledge can be used to anticipate risks of fraud.

We approach the psychological ethical or non-ethical behaviour influencing fraud in this framework similar to others such as Murphy and Dacin (2011), who used different cognitive pathways to explain fraudulent behaviour that depends mainly on reasoning. This study adds to this work by including a model that entwines the overall cognitive process that entrepreneurs (seen as individual decision-makers) follow in their reasoning when committing fraud. In our comprehensive model of fraud decisions, DIY-type entrepreneurs and the factors which influence their decisions could be categorised into three behavioural types. First, *Principle-based* – this comprises of entrepreneurs who think about others and work to maximise the benefit of the larger context they are a part of (utilitarianism). Second, *Rule-based* – this involves entrepreneurs who give great respect to the law and rules without taking into account ethical consequences. As the deontological ethical scholars assert that a moral action must be based on a set of rules rather than the consequences of the action, these types of DIY entrepreneurs are simply law-abiding regardless of ethics (deontology). Finally, *Preference-based* – these entrepreneurs are self-interested or egotistical; it refers to entrepreneurs who do not care about

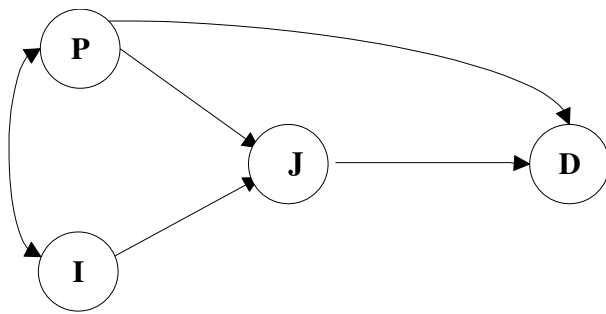


Fig. 1. Throughput modelling diagram.

Where P= perception, I= information, J= judgement, and D= decision choice.

others, being consumed by the pursuit of their self-interest (ethical egoism). The implications of these three cognitive pathways may provide a better understanding of how fraud in entrepreneurship arises.

In essence, these ethical pathways are further understood in terms of four major concepts guiding an individual entrepreneur's decisions: perception (P), information (I), judgement (J) and decision choice (D). The combination of these concepts can explain how decisions are made (Fig. 1). Besides, mathematical formulae for the decision pathways can be found in Rodgers (1997), Chapter 4, pages 43–63. Although this is a conceptual paper, examples of measuring the variables in the Throughput Model can be found in Rodgers (1997), Foss and Rodgers (2011), Rodgers and Al Fayi (2019), and Rodgers et al. (2019). Finally, examples of implementing structural equation modelling utilising Partial Least Squares (PLS) and Maximum Likelihood (MLH) solutions for the Throughput Model can be found in Rodgers (1991) and Rodgers and Guiral (2011) as well as the aforementioned publications.

In this model, perception involves the process of individual entrepreneurs' cognitive framing, their problem-solving abilities as well as their complete set of philosophical and/or their epistemological view of 'their world' (Rodgers, 2009). Bygrave and Hofer (1991), Krueger (1993), Sultana et al. (2019) and Gray et al. (2019) agree that an entrepreneur's perception of a desirable future enables them to see and justify the kind of opportunities they are willing to cease and the ones they find it feasible to reach. This, as a consequence, makes perception the main factor which influences how DIY entrepreneurs process, interpret and organise a situation to produce a meaningful experience of the world or interpret its stimuli into something meaningful based on previous experiences as well as future expectations (Lindsay and Norman, 2009; Pickens, 2005). In this regard, the entrepreneur's perceptions about potential actions play a major role in their intended actions and their choice of a particular decision or action (Simon et al., 2000; Nikou et al. 2019).

Nevertheless, *perception* is far from perfection, as different cognitive processes that are not governed by the facts sway entrepreneurial perception and judgement (Gilovich et al., 2002; Dror and Fraser-Mackenzie, 2008; Blume and Covin, 2011; Wood et al., 2019). According to Maxwell et al. (2011) and Yang et al. (2019), entrepreneurs as decision-makers rely on biases. In other words, heuristics and shortcuts drive them to make serious ethical errors in decision-making. Moreover, overconfidence, an illusion of control and belief in the law of small numbers are examples of such cognitive biases which affect the perception of opportunities (Thomas, 2018; Wiklund et al., 2018). Whilst socialisation can be discerned by its discourses, narrative logic, and ideal-type organisational models, they are each characterised by the contextual realm of differences which affect entrepreneurial vision and decision choices. Other factors such as the institutional and cultural patterns are key factors that seem to shape the social entrepreneurial narratives and paradigms. DIY laboratory entrepreneurs follow discourses that legitimise their decisions. Social entrepreneurship research suggests that emergent patterns of institutionalisation can be discerned

with each facet characterised by its own discourses, narrative logic, and ideal-type organisational models. Such patterns are the key factors that shape the social entrepreneurial paradigm. These factors eventually create what constitutes an acceptable norm as entrepreneurs compete for resources that legitimise the decision pathways in making informed decisions and choices for commercial transactions (see Williamson, 1979).

Information consists of a set of financial and non-financial information available to the entrepreneur as a decision-maker for problem-solving purposes (Rodgers, 2003). Information can affect how the entrepreneur perceives a problem or selects the type of information to be used and perceptually determined in the judgement and decision choice of the decision-making process (Tversky and Kahneman, 1974). Entrepreneurs often rely on positive information rather than negative information. The negative information appears to be more cognitively silent in nature (Simon et al., 2000; Kahneman and Lovallo, 1993). Biases may also affect the DIY entrepreneur's collection and use of information. Overconfidence may, for instance, limit the entrepreneur's collection of information where the entrepreneur comes to see their assumptions as fact (Zacharakis and Shepherd, 2001; Dey and Steyaert, 2016). Further active information collection may cause entrepreneurs to experience an illusion of control, entrepreneurs perceive themselves to be in control despite the high uncertainty or risk (Simon and Houghton, 2002).

The judgement and decision pathway used by DIY entrepreneurs under high uncertainty and complex circumstances determine the qualitative and quantitative lenses which influence their decisions. In addition, the discovery of opportunity and the cognitive construction of ethical stance surrounding that opportunity determine the level of fraudulent activities that DIY entrepreneurs could rationalise and undertake (Allinson et al., 2000; van Driel, 2019). The judgmental processes in the decision-making process require more analysis, which depends on the knowledge and experience of the entrepreneur in processing the presented information and the perceptual attention needed to evaluate that knowledge for decision-making (van Driel, 2019). In other words, judgement comes after the individual's analysis of the perception and information, according to which the process of giving judgement will start. As such, *judgement* deals with a more detailed analysis of an entrepreneur's knowledge and information (e.g., how they evaluate risks).

The ability to judge and make decisions or structure opinions objectively and wisely may depend on situational clarity or reasons causing exceptions in the circumstances at stake (see Rodgers et al., 2009; Kahneman and Lovallo, 1993). Entrepreneurs are, for instance, more likely to evaluate an opportunity more favourably when they perceive it to be less risky (Keh et al., 2002; Adner and Feiler, 2019). Entrepreneurs may also look upon situations or decisions as unique, thus isolating them from experience (Kahneman and Lovallo, 1993). According to Mansor (2015), this kind of judgement could be considered to form part of the fraud triangle. A rationalisation process typically takes place before the fraud act in order to overcome the feeling of guilt. Such rationalisation may outline a situation with an illusion of control (Keh et al., 2002; Simon and Houghton, 2002).

Consequently, if entrepreneurs find reasons and justifications for their actions and if they perceive that they are able to succeed in their endeavours using their unique set of skills under high-risk situations (Keh et al., 2002), they might reach the conclusion of feeling infallible and commit further fraud. From this perspective, DIY laboratory entrepreneurs may move from basic to advanced forms of experiments in hackspaces. They may also end up providing audacious settings and contexts for others to meet to openly discuss and share their knowledge of emerging technologies to serve as a precursor for further risks to be taken by other DIY laboratory entrepreneurs (Meyer, 2013). Under such circumstances, following previous instances of other entrepreneurial stories of being able to navigate around coming into direct contact with the law may encourage related or unrelated DIY laboratory

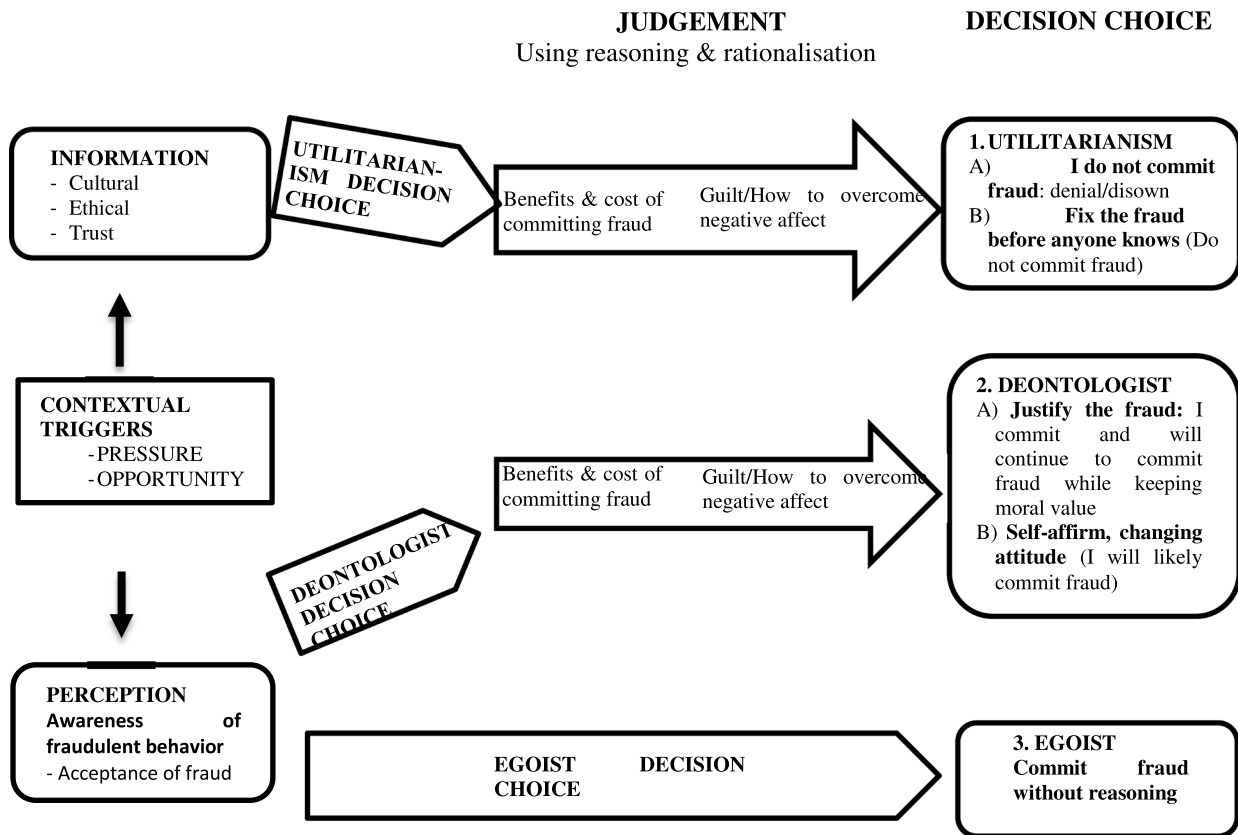


Fig. 2. A framework for fraud DIY entrepreneur pathways.

entrepreneurs to go along similar decision pathways. Hence, judgement becomes a key part of the process for justifying entrepreneurial decisions. This is because DIY laboratory entrepreneurs go through a reasoning process whereby their fraudulent behaviour becomes justified. Finally, rationalisation also provides DIY entrepreneurs with a reason (i.e., judgement) to decide; hence, it has a direct relation to the decision pathway.

Decision choice reflects the outcome of the entrepreneur's decision process. For instance, the conclusion that a certain course of action will be taken would simply imply that fraud will be committed. In the decision choice, the entrepreneur may come up with a well-defined set of alternatives, evaluate these, and finally construct the dominant rationale for that particular situation (Rodgers, 2009; Rodgers et al., 2019). The entrepreneur may receive a perception of control even in a largely controllable situation. An active information collection process could also cause entrepreneurs to become more involved in a larger number of decision choices leading to perceptions of control (Rodgers and Al Fayi, 2019). Entrepreneurs appear frequently to cross the line when "belief in one's control becomes an illusion" (Simon and Houghton, 2002, p. 112).

4. A framework for decision pathways for fraud

4.1. The psychological causation of entrepreneurial fraud behaviour

Our theory about fraud in entrepreneurship rests upon an assumption that entrepreneurs are ethical individuals. It should be noted that our framework focuses on entrepreneurs as individuals who latently believe that fraud is a 'wrong' behaviour but who might perform that behaviour by rationalisation if pressure and opportunity factors are present. According to Lavery et al. (2000), this group of people constitutes 85% of the population. Therefore, DIY entrepreneurs' decision-making in our fraud framework provides an explanation for an

individual's decisions when they face both the pressure and opportunity to commit fraud. Nonetheless, it is difficult to judge the relative importance of pressure and opportunities without the rationalisation factor for entrepreneurs and the opportunity cost of their decisions.

In other words, entrepreneurs will be less likely to commit fraud if they cannot justify their behaviour to overcome an intrinsic feeling of guilt during and after a fraudulent action has been committed. In this regard, Jackson et al.'s (2010) work entitled "Fraud Isn't Just For Big Business" found that the pressure felt by entrepreneurs is sufficient to induce a decision to commit fraud. Whilst it is in the nature of new ventures and small firms to ponder on questions about sustainability, similar to all start-ups, the current challenges facing newly established DIY laboratories seem to force them to be ethically weak. Hence, opportunities for fraud will be difficult to reduce because of ineffective internal control systems in small firms and the lack of strict regulation governing their operations. As such, DIY laboratory entrepreneurs are more likely to find strong justifications for fraud because of the fear of business failure. Marden and Edwards (2005) argue that entrepreneurs who face the consequences of losing their business tend to focus on breaking even or at least reap some form of benefits as much as they can before closure.

Conversely, if DIY entrepreneurs are unable to justify their behaviour of committing fraud by rationalising their decisions and actions, it is uncommon that fraud will ever take place. In this sense, Hogan et al. (2008) and Murphy and Dacin (2011) agree that the rationalisation element of the fraud triangle has been overlooked for several years and it remains open for future research. In this regard, the rationalisation has become the main determinant of fraudulent behaviour in DIY entrepreneurship. Thus, the decision process in our framework proposes that, when incentive and opportunity exist, the individual entrepreneurs will go through the rationalisation process to maximise return on investments. This is quite similar in all forms of entrepreneurial ventures.

5. Three core pathways for DIY entrepreneurial fraud decision-making

We next link the fraud triangle concepts of *Pressure* (motive/incentive) and *Opportunity* to the Throughput Model as contextual triggers in our entrepreneurial fraud model to explain how fraudulent decisions are taken by DIY entrepreneurs. In this sense, *pressure* creates the motive to commit fraud, which might include, for instance, money, ideology, or ego (Dorminey et al., 2012). An opportunity exists, for instance, when a control weakness is present where the perceived chance of being caught is remote. The entrepreneur may believe that they are able to commit fraud without detection (Cressey, 1950). This modus operandi creates the pressure, and the type of opportunity disguisedly presents itself as what is known in our conceptual framework as a *contextual trigger*. These triggers end up influencing the individual entrepreneur's perception (P) or information (I) in the decision-making process of committing fraudulent activity. Our framework, therefore, outlines three core pathways for entrepreneurial fraud decision-making, as presented in Fig. 2. The three ethical pathways in our model are clarified and supported by three ethical theoretical bases, utilitarianism, deontology and egoism. We next discuss the perspectives and develop a set of propositions for a better understanding of entrepreneurial fraud decision-making. The next section discusses the utilitarian decision pathways and how moral principles and entrepreneurial values serve as a compass during decision-making.

6. The principle-based pathway

The *principle-based pathway* is hereafter labelled The Utilitarianism decision choice representing the pathway (I→J→D) concerned with the consequences of entrepreneurial actions. In this decision pathway, available *information* (I) will be *analysed* (J) by DIY entrepreneurs before a *decision* is made (D), (see Rodgers and Gago, 2006). The pathway is based on the utilitarianism theory, which espouses the ideals of summum bonum – a situation whereby the good is whatever brings the highest happiness to the greatest number of people, including the entrepreneur. Utilitarianism, under which individual thinking is based, includes entrepreneurial values, attitudes and beliefs, and their orientation towards general welfare (Rutherford et al., 2009; Mill, 2016). Morality in relation to DIY laboratory endeavours is concerned with practices which are defined as right or wrong in terms of their practical outcomes for the entrepreneur and the society at large. In other words, the right thing to do for the DIY entrepreneur is the action which produces the best outcomes, in terms of material welfare, reputation, or rationality (Singer, 2003). Utilitarianism, originally proposed by Hume (1748), was advanced by Rawls (1971) and Mill et al. (1987). Mill (2016) confers it as treating people with equal consideration, regardless of personal preferences. Rather than relying on their perception about a particular situation, a decision-maker gathers more information (I) to make their decisions. Based on this thinking, DIY entrepreneurs need to be supported by providing them with standards that enable them to order information before arriving at a decision.

In fact, Freeman (1994) indicates that it is perhaps a moral truism to say that DIY laboratory entrepreneurs ought to do what they can to make the world as good a place as possible. This is because aspiring for benefits and avoidance of start-up failures may be acceptable reasons for lying (Rutherford et al., 2009). Whilst this is not to suggest that all DIY laboratory start-ups are motivated by the antecedents of profitability and cost savings (see Wolf and McQuitty, 2011), the entrepreneurial aspect of the call for this special issue and others made by Hecker et al. (2018) and Sleator (2016) seems to draw our attention towards the need to fill the chasm that exists between the knowledge and the ethical thought structures needed to manage DIY laboratories. Moreover, the alarming rate of DIY laboratory inceptions from Auckland to Zagreb provides the basis for our conceptual framework, which is presented in Figs. 1 and 2.

The utilitarian theory explains how and why DIY start-ups use the information (I) around them, dealing with the cultural, ethical, and trust systems that shape their thinking to start the venture. Consequently, the enforcement of moral foundations, obligations, promises and expectations guides the scientist in analysing (J) the information in a manner concerned with consequences – the greatest good for the greatest number of people (Clouser and Gert, 1990). The individual entrepreneur might start reasoning by making a cost-benefit analysis and, if the cost of starting a DIY laboratory is higher than the benefits, then the entrepreneur will naturally end his/her endeavour. However, if stakeholders, partners, or other authorities succeed in convincing the individual that this behaviour is for the good of the start-up or might benefit several people in society, then the entrepreneur will feel pressured and motivated to commit to the start-up, even if it means committing to actions that could have consequences in the long run. Therefore, fraudulent entrepreneurialism emerges from an individual's *judgement* of the situation concerning what would be the benefit. These precursors drive the DIY laboratory entrepreneurs to choose pathways that ultimately lead to fraud by justifying their behaviours in the context of the benefits others would receive. Reaching such decisions would mean that DIY laboratories would operate in ways that do not consider the legality or ethicality of their actions. In view of these factors, we provide 13 propositions that explain the decision pathways that could lead to fraudulent behaviours by DIY entrepreneurs, in an attempt to contextualise and conceptualise the managerial choice and policy implications given the emerging trends in the biosphere of the DIY laboratory.

Proposition 1: When the costs of committing fraud outweigh the benefits for a utilitarian DIY laboratory entrepreneur, it is less likely for the individual entrepreneur to commit fraud. However, if the benefits are anticipated to be greater, and if they are able to justify the behaviour, then there is the likelihood for DIY entrepreneurs to engage in activities that may lead to fraud.

This decision can be seen from Fig. 2 (decision choice 2) where information (I) leads to judgement (J), which includes reasoning and cost-benefit analysis. Possible costs of committing fraud include getting caught, possible financial penalties and even imprisonment. The utilitarian entrepreneurs do care about the consequences of fraudulent behaviour if it will result in harming others, and they will consider that as a cost in the decision-making process (Payne, 2006).

7. The rule-based pathway

The *rule-based pathway*, hereafter labelled the *deontology decision choice*, represents the pathway (P→J→D) and is based on the deontological ethical theory, which deals with making a decision either solely or primarily by considering the rights of individuals. The most famous deontological theory is derived from the thoughts of Kant (1938), who argued that it is better to always treat humanity (whether in your own person or in the person of any other) as a means, but always at the same time as an end. In line with keeping to the truth, keeping promises and treating people well is the right way to go while telling lies, breaking promises and treating people bad is wrong (Rutherford et al., 2009). A DIY entrepreneur sets themselves in a deontological position, which is characterised by a focus on a set of moral rules or duties. This pathway ignores additional information (I) because the rules and laws are influenced by judgement based on perceptual circumstances. In other words, there is no need for deontological entrepreneurs to search for information as the rules and regulation around them are already formulated into their perception (P), which then would be analysed to reach a decision pathway which they have chosen based on their reality.

Proposition 2: Fraud may be committed by a deontologist DIY entrepreneur through the manipulation of rules. This implies that, whilst laws and rules are important for such entrepreneurs, other factors such as mercy and faith can assume a higher place of importance under

certain situations. As such, this pathway ignores additional *information* (*I*), since the rules and the laws are encoded in one's own *perception* and analysed under situations (*J*) before a *decision* (*D*) is made (Rodgers and Gago, 2006). Therefore, factors that may encourage DIY entrepreneurs to start a laboratory could be based on a unique set of perception that they think are important to them. In this regard, Kaptein (2008) confirms that unethical behaviour occurs in situations where people lack adequate or sufficient time, information and authority to accomplish their responsibility. Deontological entrepreneurs' experience of a particular method or procedure which has been studied, memorised or practised becomes a driving force in shaping their perceptions. This embedded procedure activates the analysis process (*J*) to follow a prescribed set of rules that are applied to a situation which requires a decision. Incentives and motivation for unethical behaviours are not legislated by feelings such as kindness and sharing. Perceptual bias becomes high, which clouds entrepreneurial judgement (Rodgers et al., 2014). Instead, DIY entrepreneurs face several unethical decision-making processes which demand moral intuition, which requires moral judgement to justify behaviours.

Moreover, entrepreneurs act with emotions since they are a necessary ingredient in almost all decisions (Brundin and Gustafsson, 2013; Podoyntsina et al., 2012). Entrepreneurs are not simply rational 'computers' and previous research studies suggest that emotions matter in entrepreneurial processes (Cardon et al., 2005; Zhou and George, 2003). Moreover, emotions represent an asset and a supplementary process that is unexploited and underestimated, leaving more questions to be studied than those already addressed (Anderson, 2003; Cardon et al., 2012; Welp et al., 2012).

Hence, we present the following propositions:

Proposition 3: Emotional decision-making drivers are less likely to be found among DIY entrepreneurs with a deontological position pathway when engaging in fraud decision-making.

Proposition 4: Stress and overload increase the risk of fraud for DIY entrepreneurs with a deontological pathway in fraud decision-making.

Proposition 5: Rules and laws work as a frame for the deontologist DIY entrepreneur's thinking, which is influenced by judgement based on perceptual circumstances.

Deontological entrepreneurs start by perceiving that unethical behaviours can be acceptable based on cost-benefit analysis and moral sense of reasoning and implications on society at large. In most cases, the cost-benefit analysis of deontological entrepreneurs suggests that the chance to manipulate the rules is present and the benefits of committing fraud are higher than the costs of committing it. They are also motivated to see themselves positively, following their duties and moral rules. They also focus on the rightness of an act, not its consequences (Koukal, 2007). Because entrepreneurship is executed under uncertainty and outcomes are not defined in the first place, this causes high variance in decision outcomes and consequences for fraud for entrepreneurs. This leads to our next proposition on fraudulent decision pathways.

Proposition 6: The fraud decision of DIY entrepreneurs who see ethics as a duty may be pleasant or unpleasant whether their ventures produce riches or pain.

This behaviour, which we propose above, is presented in our framework as a self-affirmation decision pathway. Steele (1988) set the pace on the self-affirmation treatise which argues that the overall objective of the self-affirmation system is to protect an image of self-integrity and moral values. Deontological entrepreneurs possess self-affirmative behaviours by using direct psychological adaptation, which is self-protective in nature. According to Sherman and Cohen (2006), DIY entrepreneurs may have the tendency to deny or even avoid the threat of their actions. An example of this pathway is a DIY entrepreneur who values profiteering from their laboratory work. This stance would mean that other investors involved in the venture who are motivated by the desire to improve their self-image would create diverging interests and conflict of guilt for both parties. Under such circumstances, individual

investors may justify their actions by affirming the other party's personal needs, such as contributing half of their financial gains to a charity. Heine and Dehman (1997) confirm that the purpose of this pathway is to recreate each other's self-perception of the venture as doing a fundamental good to society. This leads to the next proposition about how DIY entrepreneurs see themselves when things go wrong.

Proposition 7: Deontological DIY entrepreneurs involved in fraud are likely to engage in activities that contribute towards self-integrity or moral values, which gives them fewer reasons to fight the negative feelings associated with unethical actions and fraud.

Changing attitude is the other option for justifying the fraudulent behaviour. This attitude might go from 'committing fraud is wrong' to 'committing fraud may not be so bad', which renders such individuals more likely to continue committing fraud (Murphy and Dacin, 2011). As Simon et al. (1995) observed that many fraudsters routinely argue that they did not really hurt anyone by stealing from a firm, we propose that DIY laboratory entrepreneurs have a different perception of rules which allows them to be unethical.

Proposition 8: Deontological DIY entrepreneurs tend to create a special set of rules and laws to allow them to commit fraud, whereby they assuage guilt and buttress their positive moral self-perception through the use of techniques that ignore the harm to other individuals arising from the fraud.

Whilst this type of fraud may become evident in all types of entrepreneurship, some DIY laboratories may fall under free enterprise as owners may see their venture as an innovative way to solve social problems (Choi and Majumdar, 2014). In this sense, DIY entrepreneurs who succeed in using their laboratories to solve social problems would serve as justification for doing the right thing to promote their business. Moreover, researchers have found that most DIY entrepreneurs can behave in profoundly unethical ways (Bryant, 2009; Rodgers and Gago, 2001). Therefore, it is possible that certain cognitive frames governing rules can make entrepreneurs blind to the fact that they are operating in an unethical manner (Rodgers and Al Fayi, 2019; Rodgers et al., 2019; Spiegel, 2012). Ethical awareness underpins moral reasoning and decision-making (Guiral et al., 2010). An entrepreneur's frame cognitively activates one set of goals –to be competent, to be successful while ethical frames trigger other goals (Tenbrunsel and Messick, 2004). Once entrepreneurs are in this frame of mind, they become focused on meeting these goals, and other goals can completely fade from view. That some goals take the forefront and others become suppressed highlights that entrepreneurs are not aware of their unethical behaviour (Spiegel, 2012). In sum, it is not the character that makes one unethical, but instead the situation and the 'rules' employed via a frame of mind.

Proposition 9: Since utilitarian DIY entrepreneurs care about the consequences of their actions, maximising the benefits of their enterprise to a large number of people or brandishing it with a 'socially responsible' venture could provide positive consequences to others to go along the same route.

Seeing DIY entrepreneurs violating the ethicality of their enterprise and major policies could provide others with a reason to justify their fraudulent behaviour using the 'social good' argument (Laufer, 2011). In accordance with the deontological ethical decision-making pathway, investors and partners should make sure that ethical policies are clear and well known to prevent DIY entrepreneurs from creating their own sets of rules. Policies outlining integrity and ethics should be used as strong examples by modelling the ethical behaviour that is expected from all DIY laboratory entrepreneurs.

8. The preference-based pathway

The *preference-based pathway*, hereafter labelled the *ethical egoist's decision choice*, outlines the decision pathway ($P \rightarrow D$) and is based on egoism theory. Egoist behaviour is likely to lead entrepreneurs to commit fraud without thinking about the welfare of others, which leads

to the next proposition.

Proposition 10: Ethical egoist DIY entrepreneurs move to a decision of committing fraud without rationalising the fraud.

Individuals start the decision choice by perceiving that their intention directs them in thinking that committing fraud is acceptable in order to reach their target. Egoism theory posits that individuals are always motivated by self-interest. It also claims that, when people choose to help others, they do it ultimately for their interests. Egoism theory was first introduced by [Sidgwick \(1981\)](#) contending that, when perception leads directly to a decision choice, it represents the preference-pathway. Under such instances, the arrow goes directly from perception to decision choice ($P \rightarrow D$). This pathway provides the most efficient and direct path to a decision choice. This allows us to propose that:

Proposition 11: DIY ethical egoists do not need to make an analysis (i.e., judgement) and they do not evaluate the facts available before they reach their decisions.

Rather, it is their preferences and opportunity that drive their decision pathway and they are not concerned about the consequences of their behaviour as long as they maximise their benefits. This implies that rationalising fraud and justifying bad behaviour are the hallmarks of the egoist DIY laboratory entrepreneur. [Murphy and Dacin \(2011\)](#) state that people who rationalise their behaviour are able to sleep at night, thinking that they are honest and ethical. For example, the fraudster believes they will not get caught, and then attempts to maximise their own benefits by skipping the reasoning process (i.e., judgement). In this type of decision choice, DIY entrepreneurs who set up their laboratories might commit fraud without reasoning and analysis. Creating an environment of trust and friendship between the entrepreneurs and their stakeholders is, in fact, a positive approach, which theoretically is expected to promote the firm's success ([Goel and Karri, 2006](#)). However, trust also provides opportunities for taking advantage of the support provided by stakeholders ([Rodgers, 2019](#)). Investors and partners of DIY laboratory entrepreneurs need to be careful about placing too much trust, e.g., in the entrepreneurs, and assuming that they will not behave in unfavourable ways ([Welter et al., 2004](#)). Thus, we propose that newly created DIY laboratories need to be circumspect in their approach to meeting the needs of their customers.

Proposition 12: Over-trust by partners may motivate the egoist DIY entrepreneur to commit fraud without taking into account the consequences of their actions. Partners should not depend on their positive experience about an entrepreneur in that their decisions may be affected by experience, which would lower the perceived risk ([Shepherd et al., 2003](#)). Egoist entrepreneurs might use excuses such as compensation for society and helping the needy and providing alternative ways to solve social problems as reasons to justify their actions without considering the ethical aspects of their operations ([Duffield and Grabosky, 2001](#); [Ramamoorti, 2008](#)).

Proposition 13: Risk preferences may influence the egoist DIY entrepreneur to commit fraud although they take into account the potential consequences of their actions.

Finally, it is noteworthy that the entrepreneurship literature on cognitive biases that focused on risk perception can also be applied to understand fraud risks for egoist entrepreneurs since fraud is one of the risks associated with starting new ventures. We can conclude that, since decision-making errors are costly, especially when related to fraud, attention should be paid to perception and judgmental processes in decision-making ([Milkman et al., 2009](#)).

9. Conclusion

Given the recent trends of DIY start-ups, we set the scene by providing a framework – the first of its kind to outline decision-making pathways in a model that enhances our understanding of decision pathways that lead to unethical choices in the laboratory biosphere. Our paper explains how egoist, deontologist and utilitarianism DIY

entrepreneurs behave differently according to how they rationalise unethical decisions. This explains the differences in individual entrepreneurs' decision-making in committing fraud when the opportunity and incentive to commit the offence are present. Essentially, we acknowledge differences in how individual entrepreneurs might decide to be dishonest if they believe they are able to justify the act and at the end avoid negative outcomes.

We articulate several important contributions to the study of fraud in the 'stratosphere' of DIY laboratory entrepreneurship. First, this research article contributes to the literature on entrepreneurship and fraud by exploring certain situations when rationalisation plays the main role to avoid or reduce the negative effects that come with committing dishonest and fraudulent acts. In this, impression management and influencing the perceptions of others are central for entrepreneurs in order to mitigate social interactions ([Leary and Kowalski, 1990](#); [Nagy et al., 2012](#); [Rutherford et al., 2009](#)). Second, DIY laboratory entrepreneurship is an emerging trend; therefore, it is important to conceptualise the ethical factors and decision pathways that may have potential implications for this style of entrepreneurship. Consequently, this paper explains how DIY laboratory entrepreneurs who engage in fraud are able to reduce the negative outcomes of their actions in an entrepreneurial context, which could work to identify red flags and help predict future fraudulent behaviours. Third, this paper also extends the DIY entrepreneurial literature by introducing three ethical theories used to explain individuals' behaviour in these firms. Finally, our framework can be used as a theoretical basis in entrepreneurship to investigate other risk factors of fraud and the techniques implemented to detect and prevent unethical behaviours and other behavioural tendencies for committing fraud.

The Throughput Model is relevant from a descriptive, prescriptive, and normative perspective. The theoretical relevance of the research propositions is related to the fact that previous research has often focused on entrepreneur-type entities that are ongoing and whereby little is known pertaining to emergent phases. This paper articulates ethical and fraud defences for DIY laboratory entrepreneurial types that are essential and should be an active part of their decision-making practices. Nonetheless, there has been scant research in this arena. Since previous research about DIY laboratory entrepreneurs' modelling processes is limited, there is a need for more empirical studies in this research area. This calls for further research focusing on perceptual biases that influence the behaviour of the entrepreneur. It is also pertinent for research regarding the DIY entrepreneurs' particular pathway with an emphasis on how ethical considerations can be enhanced, while fraudulent behaviour can be weakened in practice. Hence, there is both a practical and theoretical relevance in the research. Further, there is a gap in previous research, especially regarding the relational activities in DIY entrepreneurs' opportunities, since ethical behaviour along with the integration of the fraud triangle has not been explicitly involved in previous research and these issues present significant opportunities for further research.

The practical relevance of the three primary pathways (i.e., principle-based, rule-based and preference-based) is related to the often-difficult state of a DIY type of business. Since a new business often lacks a track record and, therefore, may encounter ethical dilemmas, the DIY entrepreneur ought to draw on elements of the fraud triangle and include events that produce credibility. DIY entrepreneurs need to act strategically and prudently regarding ethical considerations, and since entrepreneurs in the emergent phase need to 'act as if' the business is an ongoing one. Nonetheless, pressure in certain circumstances, weak internal controls and misguided motivations may lead to unethical behaviour that could be damaging in the long run for a DIY laboratory entrepreneur. We believe that implementing the Throughput Model along with the fraud triangle may address these aforementioned issues as well as abate negative procedures that creep into DIY laboratory entrepreneurs' businesses.

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