The role of intuition and improvisation in project management

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Abstract

Improvisation consists of a combination of intuition, creativity, and bricolage. Intuitions are rapid, affectively charged, holistic judgements arrived at without the apparent intrusion of rational thought. Improvisation and intuition represent two important and related aspects of management in general and of the management of projects in particular. There have been few, if any, studies that have examined the relationship between intuition and improvisation in the context of the management of projects. In this research we used a model of the relationships between project managers' intuitive decision making behaviours, their use of improvisation and project outcomes in order to examine whether or not intuition is used in the management of projects, how it relates to improvisation and how intuition and improvisation are linked (if at all) to project outcomes.

The research employed a cross-sectional survey design ($N = 163$) administered in two waves. Mediated multiple regression analyses revealed a number of statistically significant effects ($p < 0.05$), namely: (1) there is a positive relationship between the use of intuitive judgements and improvisation; (2) there is a positive relationship between experience and improvisation; (3) there is a positive relationship between the use of intuitive judgements and experience; and (4) the use of intuitive judgements is related to externally focused project outcomes.

These findings are discussed in terms of their implications for the following: role of intuitive judgements and improvisation in the management of projects; the ways in which both intuition and improvisation are conceptualised; and the training and development of project managers.
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1. Background

The long-standing dilemma of whether effective managerial action is better served by analytical or intuitive judgements [1] applies as much as to project management as it does to other aspects of business. Managers in general often need to make decisions in loosely structured situations where there may be a paucity of relevant information (leading to uncertainty) or where time is of the essence (and compelling them to act quickly). In such situations managers may call upon their intuitive decision making skills and improvisatory capabilities. In this research we used a model of the relationships between project managers' intuitive decision making behaviours, their use of improvisation, and project outcomes in order to examine whether or not intuition is used in the management of projects, how it relates to improvisation, and how intuition and improvisation are linked (if at all) to project outcomes. This research is significant both for researchers and practitioners because it has the potential to shed light upon the ways in which project managers process information and make judgements, and upon any improvisational behaviours which they may deploy. Moreover, it contributes more generally to the evolving understanding of the role of intuitive decision making in management. The research is significant for project managers in that its findings may, if incorporated into their training and development programs, enable them

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to come to a better understanding of the role of intuition and improvisation in projects.

1.1. Improvisation

Improvisation is becoming recognised increasingly as a means by which managers implement and embed strategic change within organisations [2], and an evolving literature is attempting to explain and contextualise this phenomenon. Improvisation has been identified as a combination of intuition, creativity, and bricolage that is driven by time pressures. In a project context improvisation involves moving away from an agreed plan in order to accelerate the implementation of actions [3–5]. Recently, the various constructs that combine to explain organisational improvisation have been extended to include elements of adaptation, compression (of timescales), and innovation [6]. In the 1960s, improvisation was seen by scholars such as Quinn [7] as an organisational dysfunction, in that it led away from the traditional incremental route of 'plan, then implement'. However, Weick [8] was an early advocate of improvisational activity, and the growing interest in and acknowledgement of this aspect of management has resulted in improvisation being more widely accepted as a skill that can assist in corporate planning exercises. This movement has accelerated in intensity in the 1990s, and given the need for faster cycle times and more innovative solutions to gain or retain competitive advantage [9]; these shifts show few signs of abating.

The move towards managerially sanctioned improvisational activity appears to be affecting how organisations address both the way in which work activity is achieved, and the way in which it is supervised. Many organisations are allowing employees to create time and opportunity to experiment with new, innovative, and hopefully more effective ways of executing work; one result of this is new and complex management challenges. If organisations are creating time, space and opportunity for employees to use improvisational working practices to develop new ways of undertaking tasks, this poses challenges for the control and supervision of work, and also creates opportunities for organisational learning and knowledge creation (via mechanisms such as those suggested by Nonaka and his colleagues whereby tacit knowledge may be made explicit). Moreover, the implications for the training, development and education of managers may be significant.

Improvisation may be seen as relating to how thoughts and action develop over time and in response to environmental cues and stimuli. Ryle [10] suggests that:

> "the vast majority of things that happen [are] unprecedented, unpredictable, and never to be repeated...[and]... the things we say and do ... cannot be completely pre-arranged. To a partly novel situation the response is necessarily partly novel, else it is not a response" (p. 125).

Ryle's assertion is that however much an activity is planned there will always be a novel set of circumstances to deal with (which echoes Donald Schon's notion of 'art-

istry' of professional practice). Improvisation requires using resources that are available to hand to resolve unforeseen circumstances: this is the essence of bricolage [11].

From the mid-1990s onwards much of the literature on improvisational work practices within organisations took this stance and applied it to organisational routines and processes. Some of these debates use metaphor to explain the way improvisation is used, for example adopting and applying ideas from jazz performance [12–16], and from improvisational theatre [9,17,18]. Later work used grounded theory to consider the temporal aspects of improvisation, and particularly the pressure to achieve complex tasks to a demanding or compressed timetable [3,4,19]. These theoretical advancements provided the foundations for subsequent empirical work – for example, Akgun and Lynn's [20] study of the links between improvised new product development and speed-to-market. Latterly, consideration has also been given to the interactions between improvisation and learning [2,6], improvisation and entrepreneurial activity [21,22], the ways in which the tacit knowledge upon which intuition may draw is acquired [23], and the role of experience in the acquisition of tacit knowledge [24].

1.2. Intuition

Alongside these developments there has been an upsurge of interest in the role of intuition in management as one way of overcoming the limits of rationality in loosely structured situations [25–29]. In this context intuition may be defined as "a cognitive conclusion based on decision maker's previous experiences *and* emotional inputs" [30, p. 93 emphasis added]. The view that we are advocating of intuition accommodates the notion of experiences and analyses 'frozen into habits' (to paraphrase Herbert Simon). These previously learned patterns leads to decisions being executed, often very rapidly, upon the basis of an 'unconscious reasoning' process which may have an affective component (a 'gut feel' or 'hunch'). This may give the impression almost of a 'sixth sense' whilst actually being based upon expertise and prior learning (both explicit and implicit). With respect to intuition's affective facet neuro-physiologists such as Antonio Damasio (see below) have advanced the hypothesis that 'gut feel' acts as a somatic 'alarm bell' warning for or against particular courses of action in advance of conscious reasoning (he and his colleagues refer to this as the 'somatic marker hypothesis').

The definition of intuition offered above (a cognitive conclusion based on decision maker's previous experiences *and* emotional inputs) is that of Burke and Miller [30] who derived it from a study that employed in-depth, semi-structured interviews with 60 managers across medium to large sized firms in the USA (each of whom had at least 10 years experience). A majority of respondents (56%) were of the view that intuition was decision making based upon

experience and almost half (47%) reported using intuition often in the workplace. For the majority of respondents it was external as opposed to internal factors that prompted intuition; for example, if a situation had no pre-determined guidelines to be followed, objective data appeared to be wanting, or where there was an overwhelming mass of information. It was those situations that lacked explicit cues, routines or procedures where experience-based intuition was relied upon (so-called 'loosely structured' situations). Paradoxically in Burke and Miller's study too much data (information overload) also appeared to lead to intuition being employed, presumably in an attempt to cut through a swathe of detailed information, see the bigger picture and avoid 'analysis paralysis'.

Whilst Burke and Miller did not explicitly test the quality of the intuitive decisions arrived at by managers, they did ask them to report on their perceptions of the quality of such decisions. Two thirds of respondents reported the view that intuition had led to better decisions. The specific benefits reported were in terms of more expedient decision making ("leads to quicker decisions"), improved quality of decision ("provides a check and balance [on rational analysis]") and facilitation of personal development ("develops a full tool set"). Burke and Miller concluded by suggesting that incorporating intuition into decision making is valid when time is of the essence, explicit cues are lacking, uncertainty prevails and when intuition is used as a balance to rational analyses. More recently Dane, Rockman and Pratt [31] found that analytical decision making works better in highly structured tasks, while intuition is most effective compared to analysis when decision-makers are domain experts who are facing tasks that are poorly (loosely) structured.

The cognitive experiential self-theory (CEST) put forward by Epstein and his colleagues [32] is helpful in conceptualising and explaining the rational and intuitive facets of managerial cognition. In this theory they argue that human information processing is executed by two parallel cognitive systems: the rational system which is affect-free and operates at the conscious level; and the experiential (or intuitive) system which is associated with affect and operates at an automatic, preconscious level. Managers' conscious thoughts and behaviours are a function of the interaction of these two systems and the degree of dominance of either system [32]. The rational and intuitive systems, and the extent to which an individual relies upon one or the other, may be thought of as preferred ways of processing information and decision making (sometimes referred to as cognitive styles or thinking styles [33]).

To our knowledge there are no previous studies that have specifically examined the role of intuition per se in the context of project management. A study by Tullett [34] looked at the adaptive and innovative cognitive styles of male and female project managers and the implications for the management of change. This work was based on Kirton's [35] adaptor-innovator theory which posits a continuum of style ranging from adaption (preferring to work by improving consensually agreed methods, products and practices) to innovation (preferring to work by reassessing and redefining problems thereby proposing changes which may appear unexpected and difficult to accept). Tullett found the mean score for project managers on the Kirton Adaption-Innovation (KAI) inventory to be significantly more innovative than that of the general population of managers. One of the main practical implications that Tullett drew from this finding was that when a relatively innovative project manager finds him or herself working with a relatively adaptive client manager there may be conflicts and differences in opinions. In the absence of clients moderating their preferences, the project manager (effectively the supplier in the relationship) may be forced into adopting a coping strategy (for example, by paying more attention to detail, de-risking decisions and being more aware of consensually agreed rules) [35, p. 364].

1.3. Intuition, improvisation and project management

Some three decades ago March [36] urged us, in our desire to understand the way in which individuals and organisations act, not to focus entirely on rational and analytic logic. Instead, he suggested that we should increasingly consider the softer sides of the human intellect, and specifically, the importance of intuition in human action. This view caused some tension in an era where management was seen as the science of planned and pre-conceived action, based on rationality and systematic forecasting. Indeed, the traditional project paradigm (as in many other areas of management practice) is one of 'plan-then-execute', but project management practitioners are aware that in modern, turbulent business environments, often the plan may cease to be effective at precisely the time when one tries to execute it.

This is where intuition and improvisation may come into play. As noted earlier, Moorman and Miner [3,4] identify intuition as a key element of improvisation (along with creativity and bricolage). A mixture of serendipity, intuition, and intentional processes may combine to influence the direction of any improvisation, which may be prompted by a belief that one can do something better or in an improved way by means other than following the plan. Improvisation is however more usually triggered to gain or recover time or react to unplanned occurrences. Within projects, as well as other areas of management, the capacity to exercise intuitive judgements (as opposed to ill-informed snap decisions or guesswork) is likely to be derived from patterns that are stored in long term memory and upon which the experienced and expert performer can call on the basis of cues observed in the environment [27]. The 'expert performer' as described by Dreyfus and Dreyfus [37] and Benner and Tanner [38] is someone who appears to have little reliance upon guiding rules or maxims, but instead has an fast-acting, intuitive grasp of situations and how to act, unlike the novice who may follow a heuristic in a detached manner ignorant of the subtleties of the context.

Eisenhardt [14], writing about organisational improvisation in terms of the metaphor of jazz improvisation, argued that the adaptive yet well executed performance, analogous to that witnessed in expert jazz musicians, is critical for effective decision making. The analogy holds since to be an improviser in jazz one has to be well-schooled in the techniques of performance upon one's chosen instrument; unskilled or naïve musical improvisation will possess a blatant lack of credibility. Switching to organisations, crucial decisions often are executed by highly skilled and experienced individuals who possess high levels of expertise acquired through explicit and implicit learning. Such expertise manifests itself as the capacity to intuit responses in complex decision scenarios with speed and flexibility. There is a long tradition of research into bounded rationality in decision making and readers are referred elsewhere for summaries (for example: [26–30]); suffice to say here that according to Simon [39, p. 38] intuition and judgement are "analyses frozen into habit and into the capacity for rapid response through recognition". Klein's studies [27] of emergency services and the armed forces in the USA found little that corresponded to the accepted rational model; rather there appeared to be a rapid and unconscious situation assessment and recognition from an array of stored templates, followed by the taking of appropriate action on the basis of an action script when a fit with a pattern was found. The actual decision making process which Klein described involved an expert encountering a problem (i.e. a situation which has a set of particular cues), the information being matched to a familiar pattern from an array of stored templates (pattern recognition) and a decision protocol (an action script) being executed almost 'automatically' [27]. Klein argued that 80–95% of decisions in loosely structured, time pressured situation use this recognition-primed (intuitive) decision process. This corroborates Burke and Miller's [30] finding that only 10% of the managers in their sample rarely or never used intuition.

One explanation for this view of intuition is that it is the product of explicit and implicit learning that manifests itself as tacit knowledge drawn upon unconsciously or with apparently low levels of cognitive effort, and often accompanied by affect. Damasio and his co-workers argue that 'gut feel' has evolved for a purpose; that the affect which accompanies intuition is functional to the extent that it is often not possible to come to decisions without taking feelings into account. Moreover, to the extent that intuition and improvisation and the tacit knowledge which may underpin them are partly products of exposure, learning and experimentation we would expect them to be related to experience (and not necessarily age since it is possible to be older but inexperienced in a specific job role). Furthermore, if improvisation is viewed as the application of expert knowledge by seasoned and experienced 'performers' one would expect it to be related to the extent to which such individuals draw upon tacit knowledge by a process of intuiting.

2. Research questions

As noted earlier, there have been few if any empirical studies that have attempted to explore the relationship between intuitive decision making and improvisation in the context of project management. The aim of this research was to examine the role that intuition plays in improvisation, and the ways in which these two phenomena relate to project outcomes. The specific research questions that we sought to answer were: (1) what are the relationships between intuition and improvisation; (2) what are the relationships between intuition and project outcomes; (3) what is the relationship between improvisation and project outcomes; (4) what are the relationships between intuition and improvisation and project outcomes? These questions are represented diagrammatically in Fig. 1 below.

Our research is exploratory, and consistent with extant theory and previous research we expected to observe a positive relationship between intuition and experience and between intuition and improvisation. We also expected any relationship between intuition and project outcomes to be mediated through improvisation (we did not anticipate a direct link from intuition to the outcome variables since an intuition may act through the behaviour of improvising). The solid line in Fig. 1 depicts the mediated relationship between rationality/analysis and intuition and outcomes; the dashed line depicts a direct relationship which is not mediated through improvisation (and one potential outcome of our analysis).

3. Methodology

In an attempt to answer these research questions we adopted a cross-sectional survey design which utilised self-report measures of rationality and intuition, improvisation and projects outcomes.

3.1. Measures

3.1.1. Independent variables

To assess managers' rationality and intuition we used the short form of Epstein's Rational Experiential Inventory (REI) [32, p. 399]. The REI is a self-report questionnaire which consists of two separate scales: 'need for cognition' (rational) and 'faith in intuition' (experiential, and broadly equivalent to intuitive) and in its original form consists of 31 items, 12 experiential and 19 rational, the latter based upon the concept of need for cognition as defined by Cacioppo and Petty ("the need for the individual to engage in and enjoy thinking", [40, p. 116]). Epstein et al. [32] report the development and validation of a short 10-item form of the REI. In the short form of the REI there were: (1) five 'need for cognition' (NFC) (rational) items each scored on a seven point Likert scale. A sample item is "I prefer complex problems to simple ones". Epstein et al. [32] reported an internal consistency of 0.73 for NFC; in our study the internal consistency of the rationality scale (NFC) was 0.71 (Cronbach
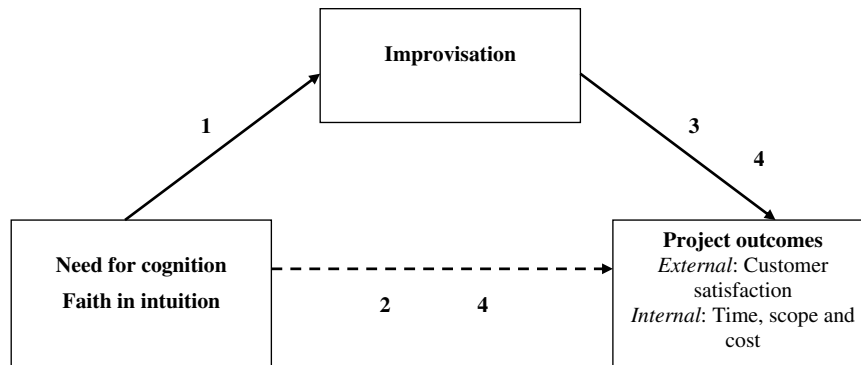
Fig. 1. Model of the relationships between rationality and intuition, improvisation and project outcomes and the associated research questions (1–4).

α); (2) five 'faith in intuition' (FII) items scored on a seven point Likert scale. A sample item is "I believe in trusting my hunches". Epstein et al. [32] reported internal consistency of 0.72 for FII; the internal consistency of this measure in our study was 0.77 (Cronbach α). The REI has been widely researched and has demonstrated validity not only in relation to theoretically related constructs but also as a predictor of behavioural outcomes.[1]

3.2. Mediating variable

In our model improvisation is hypothesised as performing a mediating role between intuition and project outcomes. The measure of improvisation that we used is based upon a scale developed by Leybourne [41] which distinguishes between improvisation at the individual level (sample item: "I improvise all the time when I am managing projects") and organisational level ("Improvisation is recognised in my organisation as a valid way of achieving project-managed change") and uses two scales in order to assess these behaviours. In the present context when used in their original form the level of internal consistency was unacceptable (Cronbach α < 0.60); therefore in order to purify the measures we conducted itemetric analyses. We amalgamated the two original five-item improvisation sub-scales and by successively deleting items with low item-total correlations (r < 0.20) we arrived at a shorter seven-item version improvisation scale that exhibited a level of internal consistency that was acceptable for exploratory research (Cronbach α = 0.66).[2]

3.3. Project outcome variables

Project outcomes are based upon success in meeting a number of criteria. Traditionally these criteria have been those that are internal to the project, namely: time, cost and scope (the extent to which the derived scheme of work meets the originally specified requirements). Latterly there has been a move toward the inclusion of the extent to which customer expectations are met (a criterion which is external to the project) [42]. Tukel and Rom [43] devised two sets of measures of project outcomes in terms of the internal criteria of time, cost and scope (10 items) and the external criterion of customer satisfaction (five items). By successive deletion of items with low item-total correlations we arrived at short forms of Tukel and Rom's scales: (a) internal performance (seven items) comprising: time (sample item: "To ensure meeting project milestones and deadlines, the re-working of non-conforming tasks is deferred and done during available slack time"), cost ("To meet budget targets, technical specifications of tasks are relaxed") and scope ("To fully meet technical specifications, deadlines are relaxed") (Cronbach α = 0.67); (b) external performance (four items): for example "We hold scheduled meetings with customers to inform them about project progress and deliverables" (Cronbach α = 0.64).[3]

3.4. Control variables

We chose to measure a number of relevant demographic and environmental variables: (a) respondents' age in years; (b) gender; (c) number of year's project management experience; (d) number of projects managed simultaneously.

4. Sample and procedure

The sample of 521 potential respondents was drawn from the membership database of the UK Association for Project Management (APM). This sample comprises a

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[1] In order to further check the integrity of the two REI scales an exploratory factor analysis (Principal Components Analysis) was performed on the REI items. The screen plot suggested that two components accounting for 52.04% of the variance should be extracted. When extracted using PCA and rotated to simple structure using a Varimax rotation two 'clean' factors corresponding to NFC and FII were apparent from the matrix of factor loadings. As an additional test we substituted Principal Axis Factoring for PCA and obtained a similar result.

[2] The project management scales used in this research may be obtained from the first-named author upon request.

[3] To check the construct validity of these two scales we conducted a Principal Components Analysis at the item level. When two principal components were extracted and rotated to simple structure the items loaded as expected on two principal components which corresponded to the internal and external outcome measures specified above.

Table 1
Means, standard deviations, scale reliabilities and correlations

| | Mean | SD | Correlations | | | | | | |
			1	2	3	4	5	6	7
External	5.30	0.73	0.67						
Internal	3.70	0.67	−0.04	0.64					
Need for cognition	5.15	0.87	0.10	0.02	0.71				
Faith in intuition	4.84	0.78	0.28***	−0.11	0.00	0.77			
Improvisation	4.99	0.73	0.08	−0.05	0.10	0.28***	0.66		
Age	45.11	7.32	0.22**	−0.04	0.01	0.04	−0.03	–	
Experience	14.69	6.94	0.12	−0.01	0.11	0.15*	0.20*	0.62***	–
Number of projects	6.58	8.33	−0.16*	0.20*	0.00	0.08	0.15	−0.15	0.09

Notes: *Correlation is significant at the 0.05 level; **0.01 level; ***0.001 level (2-tailed).

sub-set of the full membership, and includes those members who at the time of the study were engaged in project-based change initiatives within the UK financial services sector. The sample included practitioners and consultants to the sector, including project managers who were engaged within IT-driven system design and implementation. The APM endorsed the initial stage of the study, adding credibility to this phase of the research, and contributing to the composition of a focused sample covering all geographical areas within the United Kingdom, albeit biased towards major population and business centres. It is accepted that such a sample may be biased towards those practitioners who could be construed as enthusiasts of project-based methods. This could result in bias, as respondents may actively support propositions on the basis of involvement or support, or may dismiss propositions on the basis of their practice or philosophy. It could therefore be argued that such bias would be reduced or negated by the two opposing opinions. There are however advantages to such an approach to participant selection. Firstly, respondents will have sufficient knowledge of the issues being interrogated in the questionnaire. Salience is seen as an important factor in influencing respondents to complete and return questionnaires.[4] Secondly, they will be responding from a position that reflects actual practitioner recognition and application of the issues. Thirdly, a measure of allegiance with the origin and purpose of the questionnaire may assist in increasing the response rate. The survey was conducted in two waves with non-respondents re-mailed after a period of two weeks had elapsed. The total number of usable responses received from the 521 which were mailed was 163, representing a response rate of 31.3%.

5. Results

5.1. Descriptive statistics

Means, standard deviations and internal consistencies (Cronbach α) are shown in Table 1. As noted above, all of the study variables exceeded the minimum value of

[4] Roth PL, Be Vier CA. Response rates in HRM/OB survey research: norms and correlates, 1990–1994. Journal of Management 24(1):97–117;1998.

Cronbach α suggested by Finkelstein [44] for research of this nature. The first and second wave respondents were compared on the independent (rationality and intuition), mediating (improvisation) and outcome variables. With the exception of the mediating variable ($t = −2.24$; $p < 0.03$) there were no statistically significant differences between the first and second waves.

5.2. Correlations and sub-group comparisons

The correlations between the study variables are shown in Table 1. In terms of sub-group comparisons an incidental relationship that was investigated was the relationship between rationality, intuition and gender. It has been claimed, sometimes on the basis of the stereotype of female intuition, that females are more intuitive than males (see [45]). We failed to observe any significant differences either with regard to intuition ($t = −0.31$; $p = 0.38$) or rationality ($t = 0.60$; $p = 0.28$) (one-tailed test). This is consistent with the findings of Epstein et al. [32]. Moreover, it has also been suggested that rationality and intuition are the two opposite extremes of a bipolar, uni-dimensional continuum of cognitive style. This view has not gone unchallenged [33]. Commensurate with Epstein's dual process cognitive-experiential self theory, previous research [46] and with Hodgkinson and Sadler-Smith [33] the data in the present study revealed a correlation between rationality and intuition that was low and non-significant ($r = −0.002$) thus supporting the view that rationality and intuition are unlikely to be opposite poles of a single dimension, and corroborated also by the PCA and PAF analyses reported in the relevant footnote – see above (Epstein et al. reported a correlation of 0.08 between NFC and FII).

If, as some have suggested, intuition is accumulated expertise we might expect a relationship between experience and intuition. Indeed there was a statistically significant relationship between experience and intuition ($r = 0.15$; $p < 0.05$, two-tailed test). We further investigated the effect of the nature of the domain expertise of respondents (specialist or generalist) in the regression analyses (see below). The correlation between intuition and age was non-significant. The correlation between experience and improvisation was, as anticipated, statistically significant ($r = 0.20$; $p < 0.05$). The correlation between improvi-

Table 2
Regression analysis for first equation (mediator onto independent variables)

Rational, intuitive and improvisation	Variables	Improvisation (β)
Controls	Experience	0.23**
	Number of projects	0.09
	Nature of expertise	0.12
Independent variables	Need for cognition	0.14
	Faith in intuition	0.24**
Summary statistics	R^2	0.19
	F	6.68
	P	<0.001

Table 3
Regression analysis for second equation (dependent variables onto independent variables)

Rational, intuitive and performance	Variables	External (β)	Internal (β)
Controls	Experience	0.07	−0.03
	Number of projects	−0.18*	0.22
	Nature of expertise	−0.08	−0.05
Independent variables	Need for cognition	0.12	0.01
	Faith in intuition	0.27**	−0.08
Summary statistics	R^2	0.13	0.05
	F	4.25	1.63
	P	0.001	0.157

Table 4
Regression analysis for third equation (dependent variables onto independent variables and dependent variables onto moderator)

Rational, intuitive, mediator and performance	Variables	External (β)	Internal (β)
Controls	Experience	0.08	−0.03
	Number of projects	−0.18*	0.22
	Nature of expertise	0.08	−0.05
Independent variables	Need for cognition	0.12	0.01
	Faith in intuition	0.27**	−0.09
Mediator	Improvisation	−0.02	0.03
Summary statistics	R^2	0.13	0.05
	F	3.52	1.36
	P	0.003	0.235

sation and intuition, as we expected, was statistically significant also ($r = 0.28$; $p < 0.001$).

5.3. Regression analyses

In order to test the mediated model of the type that we outlined earlier, we used the definitive guidelines developed by Baron and Kenny [47] which have been widely applied [48].[5] We conducted three separate regression analyses according to the protocol suggested [47]. The results are shown in Table 2.

The first equation was statistically significant ($F = 6.68$; $p < 0.001$). This meant that experience of project management was positively related to improvisation ($t = 3.05$). Intuitive decision making and improvisation were positively related ($t = 3.06$). The second equation was statistically significant for the external outcome measure (customer satisfaction) ($F = 4.25$; $p < 0.001$) but not for internal outcomes ($F = 1.63$; $p > 0.05$) (see Table 3). Intuition was positively related to external project outcomes ($t = 3.37$). The number of projects was negatively related to external project outcomes ($t = -2.30$). As far as external outcomes are concerned the model met the first two of Baron and Kenny's three criteria; however, with respect to internal outcomes the model failed to meet the second criterion. The third equation was statistically significant for external outcomes ($F = 3.52$; $p < 0.01$), but was not significant for internal outcomes ($F = 1.36$; $p > 0.05$). The mediator (improvisation) was non-significant in the third equation for external outcomes and hence the model failed to meet the third of Baron and Kenny's criteria; it did not therefore pass the test for mediation [47]. When entered

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[5] If a model is considered to comprise three relationships (independent variable (IV) and mediator (M); mediator and outcome (O); and IV and O) mediation may be tested for by examining the linkages in the model through regressing: (a) improvisation onto rationality/intuition (M → IV) – first equation; (b) project outcomes onto rationality/intuition (DV → IV) – second equation; (c) project outcomes onto rationality/intuition (DV → IV) and onto improvisation (DV → M) – third equation. Baron and Kenny then go on to stipulate three conditions that must hold if mediation is to be established: IV must affect M in the first equation; IV must affect DV in the second equation; M must affect DV in the third equation C. If all three conditions hold then the effect of IV on DV must be less in the third equation than in the second equation [47, p. 1177].

into a multiple regression with the other variables, experience showed a significant relationship with improvisation (see Table 4).

The main findings from the regression analyses may be summarised thus: (1) the use of improvisation appears to be related to the use of intuitive decision making; (2) externally focused project outcomes appear to be related to intuition – managers who deploy intuitive judgements give greater emphasis to external project outcomes (i.e. those related to meeting customer needs) than do their less intuitive counterparts; (3) more experienced managers reported greater use of intuition and improvisation than do less experienced managers. Note that although, as might be expected, age correlated with experience ($r = 0.62$; $p < 0.001$), age was unrelated to improvisation or intuition; (4) the number of projects adversely affected external project outcomes; (5) the nature of participants' expertise (specialist or generalist) was unrelated to intuition or improvisation.

6. Discussion

These data suggest that project managers' intuitive decision making is positively related to their use of improvisation. Furthermore, their use of intuition also appears to be related to the extent to which they treat customer satisfaction issues as important outcomes of projects. Rationality

(need for cognition) on the other hand was not associated with the use of improvisation. In terms of what this means behaviourally, these findings indicate that improvisation is associated with the extent to which managers trust their initial feelings, rely upon 'gut feel', have faith in their initial impressions and are inclined to trust their 'hunches'. The association between the use of intuitive judgements and external outcomes may suggest that because the latter involves greater use of complex (and people-related) judgements, experience and expertise may have a role to play. These unstructured situations may be dealt with more efficaciously (accuracy and speed of response) by deploying intuition [31]. Internal outcomes are more likely to be amenable to rational analysis (resource allocation, return on investment, risk exposure and so forth), whereas external outcomes are related to customers and have more difficulties to take into account (satisfaction, change resistance and so forth). Another related explanation of this may be that the use of intuition could well be linked to confidence (since intuitions are often accompanied by a confidence in their rightness or wrongness) and by association expertise (since intuition as defined in this research is a manifestation of experience and expertise). However, in the absence of further evidence the latter remains speculative.

Empirical evidence from Leybourne [41] indicates that experienced project managers improvise more than those with less experience – a finding supported by the present research. Intuition was positively associated with the extent to which managers felt that they engaged with meeting customers' requirements and satisfaction needs (one of our outcome measures) – these are the 'softer' outcomes requiring more complex, interpersonal judgements (drawing perhaps upon facets of emotional intelligence and social intuition). The relationship with improvisation is explicable in terms of the extent to which managers are drawing upon unconscious expertise and tacit knowledge (which they may label as a 'hunch' or a 'gut feel'). The relationship with customer satisfaction is perhaps explicable in terms of the role of feelings and emotions; managers who are amenable to the influence of their own feelings and emotions in their behaviours (as manifested in their faith in intuition) may also be sensitive to the needs, wants and feelings of customers. They may therefore be more prepared to expend additional effort in order to meet customer expectations than are managers who are less sensitised to intuition and who may be more 'coldly rational'. However, these are issues which future research might aim to explicate in greater depth.

Another influence may be the fact that we are specifically dealing with the intellectual and emotional working practices of project managers, and a core consideration within the basic project management paradigm is meeting the three key deliverables of a project, namely time, cost and scope. Of these, scope is basically the customer requirement in respect of what is to be delivered, and project managers must therefore be strongly focused on meeting those documented customer expectations. A related issue is the covertness of improvisation within projects. Knowledgeable and experienced project managers are tasked to deliver outcomes within organisations quickly and incurring the minimum of risk. However, moving away from a documented plan is seen as risky, and the safety net of joint planning and agreement on schemas of action is removed when a project manager decides to improvise. Against this backcloth it would not be unsurprising if rational analysis legitimised authority and actions. Because of this, much improvised activity may happen surreptitiously, and take place 'below the surface', and perhaps even instead of the documented and agreed tasks and activities required by the formal project plan. In Agor's study of intuition [49] nearly half the respondents indicated that they kept the fact that they relied upon intuition a secret, whilst others reported a posthoc rationalization for decisions arrived at intuitively (a finding replicated a decade later in Burke and Miller's study). However, notwithstanding these issues, it is certainly inevitable that experienced managers build a personal repertoire of routines, practices and mechanisms that are recognised by them and others as known remedies for problems that may arise during the project. Much of their repertoire of patterns and associated scripts is built up as a result of the capture of successful improvisational activity, some of which may be acquired through implicit learning and stored as tacit knowledge and best passed on through processes such as observational learning and role modelling in a community of project practitioners.

An unexpected outcome from this study was the lack of any statistically significant relationship between improvisation and satisfactory project outcomes. Many project managers profess to improvise in the expectation that this will have a benefit in achieving the deliverables of their project. There is however evidence that much improvisational activity is incurred to 'claw back' time and cost over-runs, or to meet customer demands for changes to scope to provide increased functionality. Many project managers would argue that this is endemic because unrealistic goals or objectives have been imposed upon them by senior managers or project sponsors with insufficient knowledge of the challenges of the proposed programme of work. The evidence from this study identifies a link between experience and a tendency to improvise. Perhaps this experience, informed by the tacit repertoire of routines, practices and mechanisms built up over time, and coupled with an intuitive feel for the inherent problems within a given project, encourages improvisation to lessen the impact of unrealistic project targets and deliverables. Future research might examine the relationship between intuitive judgements, improvisation and outcome measures (ideally of a non-self-report nature).

This research project was focused upon a specific sector (financial services). Future research might usefully focus upon the question of whether or not improvisation and intuition vary across different types of projects rather as well as sectors. For example, with regard to technically complex projects such as those in aerospace or clinical

research the question of improvisation and intuition are relied upon, what might be the effects of improvisation and intuition, and what are their impacts further down the project? One might anticipate that in tightly structured situations (for example, where salient variables are known, quantifiable and controllable) there may be no need for intuition or improvisation; however, the question is raised of how do experienced managers act in those loosely structured situations which are prone to uncertainties and changes and many of which may be difficult or impossible to predict? What roles do experience and expertise play in the success or otherwise of intuitions in these scenarios? There is a pressing need for additional research which examines the relationships between project type, environmental uncertainty and level of experience and expertise of managers and their effects upon outcomes. The issue of job level has not been examined in this study, but questions remain about the extent to which seniority confers upon managers the opportunity to improvise and intuit. Future research might overcome the limitations of this cross-sectional study by employing laboratory studies, experimental and longitudinal research designs as well as critical incident reviews of those remembered scenarios in which intuition helped and those in which it hindered.

7. Implications

This research indicates that project managers do improvise. Moreover, extant theory along with our findings presents mounting evidence that an antecedent of improvisation is very likely to be those affectively charged, non-conscious cognitively based judgments which we refer to as intuition, hunch or gut feel. Intuition, which itself is rooted in expertise, may drive improvisation. As noted above further research is required to: (a) explore the conditions under which and the reasons why managers may deploy intuition and improvisation; (b) examine the role that expertise plays in this process; (c) investigate the effectiveness of intuiting and improvising in projects. Moreover, the fact that intuition and improvisation are used by project managers (perhaps covertly in their organisations) is an argument for including intuition and improvisation as topics for discussion in every project managers' training in order to bring both issues 'out of the closet' and so that ultimately these two important issues may be better understood and more effectively managed. A number of researchers have argued that it is possible for managers to be trained and developed in order to become better at intuiting. Ways in which this might be achieved are likely to rely upon the extensive use of practice [27], involvement in simulations in which managers can experiment in order to hone their project and decision-making skills, accelerating the acquisition of expertise through intensive coaching and role modelling [50], having workplace learning environments which foster good intuition through effective feedback [26], and the probing of intuitive judgements oneself and in conjunction with others through techniques such as devil's advocacy in order to

uncover potential errors and biases [29]. A number of researchers have examined recently the leadership competencies of project managers [51], including their emotional intelligence [52]; the question of whether projects managers' ability to understand and manager their intuitions is one of the competencies that is important in dynamic and uncertain environments is an intriguing one for future research. Such work may shed light upon the relative contributions that rationality and intuition may make to the success of projects under different sets of circumstances. Ultimately, this line of enquiry may help researchers and practitioners come to a clearer view of where and when project managers might be able to trust the intuitions which they undoubtedly use with a greater degree of confidence.

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