Chapter 2
Construction Incentivization in Perspective

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Abstract Construction incentivization in this book is used as a collective term for all forms of incentive arrangement that aim to engender extra effort of the contracting parties for the improvement of project performance. It is quite often assumed that all enterprises are seeking continual performance. In this regard, incentives in various forms have been used as performance motivator. In construction projects, incentive schemes have also been used to engender performance. Typically, incentive arrangements in construction involve setting cost, schedule, and outcome performance targets. Moreover, the success of incentive schemes is not guaranteed. It had also been found that many projects with incentives still end with project overruns, huge claims, and embarrassing defects. This study identified several design assumptions of conventional incentive that may not suit the ever-increasing complex projects. First, the targets for incentives are often set without consultation with the ultimate project performer. Second, the targets are quantified thus are outcome based. Third, no consideration is given to the behavioral aspect of the incentive. Fourth, there is no appropriate arrangement to solicit superior performance. With reference to the commonly used theoretical underpinnings of incentive arrangements, it is suggested that to have effective construction incentivization, it is necessary to have the scope jointly formulated by the major stakeholders. In this connection, the outcome targets must be agreed. Ideally, risk allocation can be much enhanced should construction incentivization can be used ex post to address ex ante unidentified risks. To bring about superior outcome, incentivization should embrace elements of behavioral performance.

Keywords Construction incentivization · Design assumptions · Competence or beyond

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1 Introduction

All enterprises are seeking continual performance. In this regard, incentives in various forms have been used as performance motivator. Herten and Peeters (1986) reported the wide use of incentive schemes in many manufacturing sectors such as military developments and aerospace contracts. In construction, incentive schemes have also been used to engender project performance. Likewise, Ibbs (1991) suggested that construction incentive plans can be valuable contract administration tools to enhance project success.

Typically, incentive arrangements in construction involve setting cost, schedule, and quality performance targets (Zhu & Cheung, 2021). That means final project outcomes determine if award will be accorded. Suprapto et al. (2016) analyzed 113 capital projects and found that projects with incentives are likely to perform better if contracting parties value their relation and work as a team. Partnering/alliance contracting approach has also been advocated because of the attempt in developing relational attitude. Ibbs (1991) also recommended that, inter alia, incentive schemes must be fair, and interest balanced.

Nonetheless, the record of the incentives used in construction projects is unconvincing, especially for complex projects. Zhu et al. (2020) reported that many mega projects with incentive schemes still failed to achieve the project targets. Thus, what are the missing links? Boukendour and Hughes (2014) pinpointed that one of the major and recurring problems in designing cost incentive contracts is the setting of target cost and risk sharing ratio. These are essential because of the fundamental issue of maintaining an equitable sharing of risks and rewards to align the interests of the contracting parties, and so to eliminate the adversarial nature of their relationships. The authors further added that an equitable risk-sharing formula would foster trust and cooperation. To this ends, Chapman et al. (2008) highlighted the importance of having a balanced incentive, meaning that incentives should align the interests of client and contractor. These studies also suggest that although incentives do not always work, there are certain design parameters that should be observed. This chapter aims to identify the common issues in the formulation of construction incentivization (CI). CI is used as a collective term that covers all forms of incentive arrangement that seek to improve project performance (Zhu & Cheung, 2022). This study covers the following research tasks:

- Identify the types of incentive scheme commonly used in construction industry.
- Consolidate observations on conventional practice.
- Review the theoretical bases of incentivisation.
- Suggest alternative perspective on the expectations on construction incentivization.

2 Types of Incentives Commonly Used in Construction

Bower et al. (2002) define incentivization as '**a process by which a provider is motivated to achieve extra 'value—added' services over those specified originally and of material benefit to the user'**. The main purpose of incentivization is to adopt client's objectives as well as maximize its own profits (Meng & Gallagher, 2012). Incentive schemes are related to three categories: cost incentive scheme, schedule incentive scheme and quality incentive scheme (Herten & Peeters, 1986).

Zhu and Cheung (2021) studied the use of incentive schemes in the Hong Kong construction industry, 10 structured interviews were conducted with senior construction professionals. The particulars of the interviewees and the incentives used in their respective projects are summarised in Table 1.

The key findings from these interviews are summarized in Table 2:

3 Overview of the Practice of Construction Incentivisation

The commonly used forms of incentive are related to cost, schedule, and quality.

Table 1 The particulars of the interviewees and the incentive schemes used

No	Organisation	Capacity	Incentive scheme used		
			Cost	Schedule	Quality
1	Government	Government department for public facilities other than public housing	√		√
2	Government	Government department for public housing			√
3	Government	Government department for land planning and infrastructure management	√		√
4	Developer	Historical building conservation		√	
5	Developer	Private developer, listed Hong Kong company	√		√
6	Developer	Private developer, Mainland capital		√	√
7	Contractor	Main contractor	√		√
8	Contractor	Main contractor		√	√
9	Contractor	Main contractor	√	√	√
10	Consultant	QS Consultant		√	√

Table 2 The key findings from the structured interviews

No	Particulars	Types of incentive scheme		
		Cost	Schedule	Quality
1	Incentive schemes provisions	NEC contract with Option C	Responsive acts to prevent project delay	Performance assessment scoring system Pay for safety scheme
2	Aims of the incentive schemes	Communication tools to enhance collaborative working and attract contractors to come to the negotiation table and drive them to focus on the specific targets of the contracts		
		Collaborative working; Generate innovations to save project cost	Quicker completion	Better project performance
3	Barriers against the implementation of the incentive schemes	The conflicts between the project management style and current organizational managing system for adopting target cost contracts	• The manoeuvrability based on limited labour and resources • The contractor may overly on the rewards, they may lay back only for bonus	The standard may be too strict and combat the enthusiasm of the workers
5	Arrangements to enhance the working of the incentive schemes	Target cost estimation at each stage to evaluate the extent of cost-saving	Set milestones and distribute bonus at each stage	Set detailed assessment standards; hold monthly meetings to adjust targets flexibility
6	Effects of the incentive schemes	For individuals, the effect of the incentives usually comes from the pressure of the senior managers. From organizational basis, all the cooperative behaviour is based on the achievable of their commercial benefits		
7	Positive impact on organizational issues	• Commercial benefits • Organizational relationships	• Commercial benefits • Organizational relationships	• Social reputation • Organizational relationships • Working climate of improving the quality of the project

3.1 Types of Incentive

Cost incentive scheme

Cost is one of the most significant performance indicators. Most cost incentives aim to keep cost down either through saving or minimising expenses. These incentives work a bit differently with the types of contracts used. For example, for fixed price contract, CI can provide profit adjustment for project targets set. For cost reimbursement contract, bonus can be allowed should the cost is below certain benchmarks (Kwawu & Laryea, 2014; Perry et al., 2000).

Schedule incentive scheme

When time is of the essence or the project is experiencing unacceptable delay, schedule incentive scheme is used as the bait to accelerate progress. Typically, the contractor is offered a premium for either early completion of the project or compressing the project programme (Abu-Hijleh and Ibbs, 1989; Richmond-Coggan, 2001). In some cases, non-achievement of the incentive schedule outcome would attract a penalty (Abu-Hijleh and Ibbs, 1989).

Quality incentive scheme

Quality incentive schemes are more difficult to formulate and monitor. Essentially, quality targets should be specified. Moreover, it may not be possible to detail quantitatively the required standards. Thus, project employers that aim for high quality finishes sometimes would instigate more stringent quality requirement like limiting the number of defects. Bearing in mind that many minor defects may fall within compliance level individually, would create unacceptable overall final product (Meng & Gallagher, 2012). Compared with cost and schedule incentive schemes, the assessment for quality performance is more complex and sometimes controversial.

In practice, composite arrangements linking cost, schedule and quality performances are commonly used for complex tasks.

3.2 Other Notable Observations

With reference to the afore-mentioned study by Zhu and Cheung (2021), it was found that the incentive schemes used in Hong Kong are more often being initiated by the project employers in the public sector. For private developments, very often incentive schemes are formulated after the project has encountered certain difficulties. In such circumstance, CI is used as a remedial measure. Other than the board use of CI, the following operating patterns are observed: The first observation is unilateral imposition. Incentives are primarily used to solicit efforts from the contractors to resurrect the problem. From the perspective of classical economics, all profit-oriented commercial organizations will respond to benefits derivable from

an incentive. Moreover, if the initiator is the sole beneficiary, the commitment of the contractor is unlikely. The situation is even more tricky when the employer is likely to sustain more harm if the problem is not resurrected. One typical example is when incentive for acceleration when the employer has caused project delay. Thus, it is not uncommon to find contractors perceiving unilaterally imposed CI by the employer is only serving the interests of the initiators.

The second observation is CI reward is determined by the attainment or otherwise of predetermined quantified targets. Most of the CI are related to schedule, cost, and quality targets. Understandably these three outcomes are of most concern to the employer. Two issues arise here. First, are the targets realistic? Second, how about other non-quantifiable targets, especially those visual effect of finishes. It has been well documented that incentive targets must be attainable.

The third observation is the award is solely dependent on the achievement of the targets irrespective of the efforts expanded. In this regard, efforts are directed only for the outcome record. This issue is most apparent when innovative ideas are involved. It is not difficult to realise that all innovative ideas are risk prone. Incentive award that takes no account of efforts is not conducive to innovation.

The fourth observation is the absence of clear performance motivator. There is no expectation on the contractor to raise efficiency beyond mere competence. That means there is no expectation of extra effort that goes beyond what has already contracted for. In this connection, superior performance is unlikely.

In views of these observations, the most cited theoretical anchors of incentivisation are discussed in the next section with the aim of identifying the appropriate design concepts for construction incentivization.

4 Theoretical Anchors of Incentivization

The working of CI is inevitably anchored on the concepts of motivation that involves the urging to perform an act, to obtain a certain object, or to produce a desired outcome (Teitelbaum, 1958). Motivation therefore is a process to energize, maintain, and direct behaviours towards attainment of goals (Bootzin, 1991). The force can be ‘drive’ or ‘pull’ depending on the nature of the exchange (Baron, 1995). Motivation at work when incentives provide the tangible target to work for. The overriding goal of contractual incentives is to achieve agreed project goals (Richmond-Coggan, 2001). According to goal-setting theory (Locke and Latham, 1984), goals must be meaningful, clear, and achievable. When rewards are contingent on goal attainment, a motivated performer would derive greater effort should the perceived benefits are material and worthwhile (Locke and Latham, 1990). Bandura (1993) further added that a performer would also consider her own ability to attain the goals. Thus, unrealistic goals would not attract performance.

The following theories have been put forward to explain drivers of performance:

- Utility theory
- Principal Agent theory
- Prospect theory
- Self-efficacy theory
- Self-determination theory

4.1 Utility Theory

Utility theory (UT) is about people's choices and decisions. It is concerned with people's preferences and with judgments of preferability, worth, value, goodness, or other similar concepts (Fishburn, 1968). Interpreting utility theory can take two forms: prediction, and prescription. Predictive approach focuses on using utility to predict choice of actual behavior. On the other hand, prescriptive approach offers decision pointers. Unsurprisingly, psychologists are more interested in the predictive approach in recognition of the fact that one's decision is very often influenced by the decision of the others, especially your negotiating counterpart. When in predictive mode, utility theory is widely known as predictive utility theory (PUT). If accurate prediction is possible, prescription shall become plausible. That means, if it were possible to predict accurately the actions of other people (for example, customers or competitors), then the prescriptive approach would have the necessary conceptual foundation. Decision makers can perform their job utilizing different approaches, including applying heuristics. Nevertheless, maximizing utility has been advocated as the most rational approach by the economists.

Prescriptive utility theory is formulated based on the assumption that perhaps is more well-known as a common-sense guideline for the individual to follow in identifying his preferences with justifications. It is a logic-like criterion that consistency and coherence can be attained if preferences are formulated accordingly. It is further suggested that the preferential choices can pass the transitivity test. There are several interrelated purposes of prescriptive utility theory (PUT):

- PUT can be applied as a normative guide to help decision maker to codify his preferences. If one's preferences do not match with the "rational" order, PT would suggest a re-examination of the preferences to identify inconsistency to restore the rational call.
- PUT has the function of helping a decision maker to identify his preferences among complex options. Given the multidimensionality and uncertainty of the options, making preference among them is beyond intuition.
- PUT offers quantitative structure for judgment based on metrics. It is also possible to deploy optimization algorithm to explore the options. The relative strength and weaknesses of the options can be examined in detail.

Notwithstanding the advantages offered by PUT, it is not free from criticism. For example, Burke et al. (1996) devised an experiment to test if expected utility theory

works with monetary incentives- a situation identified as Allais Paradox. In simple terms, monetary incentives do not always drive improved performance.

The experiment by Burke et al. (1996) involved college students as subjects and the findings supported the Allais Paradox. Nonetheless, it was found that violations against expected utility theory are significantly reduced when lotteries are real rather than hypothetical. It can be concluded that utility theory and her propositions are logical deduction of expected return on performance. In a nutshell, it works like a cost-benefits analysis. When net benefits are envisaged, it is fair to predict that corresponding performance would follow. Economic rational individuals are expected to follow this "common sense" logic. Moreover, when other non-economic influencers are in action, the prediction is less robust. The question for construction incentivization is whether the assumptions of the utility theory are applicable in construction contracting businesses. Whether the use of composite incentive arrangements can be a plausible way to overcome the drawback of diminishing marginal utility of reward deserves further research efforts.

4.2 Principal Agent Theory

Classical principal agent theory (PAT) (Eisenhardt, 1989) involves a (risk neutral) principal, employing a (work averse) agent to act on his behalf. The agent possesses private information, e.g., about his effort level, the state of nature etc. that is undisclosed to the principal. Thus, the parties are asymmetric in terms of information. The agent is supposed to act to maximize his utility. Concomitantly, he is also work averse in the sense that other opportunities would tempt him to reallocate his resources so that his 'overall' utility is maximized. Trade-offs across jobs are possible. The combination of information asymmetry and the agent's aversion both to work and risk, steer him away from cooperative behavior.

Sappington (1981) outlined four canonical working settings between principal and agent. The first is symmetry of precontractual beliefs. Essentially, this means that both principal and agency share the beliefs about the tasks such as complexity and difficulty and level of efforts needed. As such, it is likely that they can come to a set of common goals for the contract. The second is the agent is presumed to be risk-neutral. However, the reality is seldom the same. What the principal can do is to adopt an equitable risk sharing principle in the contract. The third is the assumption that the agent can be bound to the terms of the contract at no extra costs. Essentially, this view is rather legalistic which the commercial reality may prove difficult. The fourth is the expectation that the agent's performance is publicly observable. This may be the most problematic. Without conscientious effort on monitoring, it is quite unlikely that the principal would know the 'exact' performance of the agent (Grossman & Hart, 1983). Thus, incentives are often used to maintain the desirable performance settings. Typically, an optimal incentive contract involves a pay-for-performance scheme which ties the agent's reward to performance outcomes.

In sum, in a principal-agent relationship, the principal offers a contract to the agent. Once the contract is signed, it is likely that the agent will choose to take actions that maximize his overall utility that the contract allows. Theoretically, the efficiency loss due to the agent's self-interested behavior is measured by comparing the effective outcome under asymmetric information with a fictitious outcome under symmetric information. The redress is to bridge the information gap. Symmetric information simply allows the principal to prescribe and control the desired action. Moreover, the caveat of aligning the interests between the principal and the agent would nullify motivation because the required actions now serve the interest of all actors. The element of self-interest diminishes. Therefore, to address both conflict of interest and information asymmetry, optimal incentive contracts should support partitioning of decision rights and controlling discretionary behavior.

The implications on construction incentivization are the ability to deal with conflict of interest and informational asymmetries between the parties. Raising performance incentives would raise the agent's productivity when risks are not considered. Ironically, psychological concept of intrinsic motivation suggests the opposite. According to cognitive evaluation theory, performance incentives through state-contingent rewards may diminish an agent's intrinsic motivation (Ryan & Deci, 2000b). Likewise, Kunz and Pfaff (2002) examined whether intrinsic motivation would be diminished with the installation of incentives? In fact, Deci (1975) had long found that reward could stifle intrinsic motivation. The presence of extrinsic reward like incentive induces crowding out of intrinsic motivation (Frey, 1997) which is also termed as hidden cost of reward by Lepper and Greene (1978). Moreover, these constructs remain hypothetical, and their existence have not been empirically proven. Heckhausen (1989) proposed that intrinsic motivation has the following manifestations:

a. Intrinsic motivation is internally driven and does not aim to reduce the drive like thirst and hunger.
b. Motivated acts are carried out like leisure time pursuits.
c. Intrinsically motivated behaviors are determined by the performer.

In a principal-agent relation, the potential negative impact of incentive on intrinsic motivation cannot be overlooked. Whether extrinsic motivation will diminish intrinsic motivation depends on the drivers of intrinsic motivation. One such effect is over-justification: attributing one's behavior because of extrinsic reward may undermine the intrinsic motivator. However, if reward convey positive message about the performer's ability or competence, the performer will assume personal responsibility over his behavior. If rewards promote the acquisition of new skills, the perception of intrinsic interest in that activity is deemed necessary. In construction contracting, conflict of interest and information asymmetry are inevitable in employer-contractor relation. The key to motivate work-averse contractor perhaps lies in how incentive arrangements can successfully engender intrinsic motivation.

4.3 Prospect Theory

Prospect Theory (PT) was initiated by Kahneman and Tversky (1979) as a decision-making model. PT offers explanation of some phenomenon that cannot be explained by the Utility Theory developed by Von Neuman and Morgenstern (1953). In essence, UT does not predict well when decisions must be made on events subjected to risks. Basically, utility maximizing may not be the primary decision criteria of risk-taking or risk-averse decision makers. Edwards (1966) put forward three forms of effect when prospect must be considered:

a. Certainty Effect: There is a tendency to underscore probable outcomes in comparison with outcomes that are certain. This tendency would bring about risk-aversion for options involving gains and risk-seeking for options with loss prediction.
b. Isolation Effect: It is of interest to note that it is often the common elements threading across the options are being ignored. Isolation effect would result in framing of a prospect in a way that favors the choice that the decision-maker generates.
c. Reflection Effect: Very often, choices come in pairs of negative and positive prospect (mirroring).

Edwards (1996) further explained that analyzing prospect comes in two phases. The first phase is editing that aims to organize and reformulate the options so that subsequent evaluation and choice can be simplified. Editing thus involves the application of transforming the outcomes and probabilities associated with the offered prospects. The second phase is evaluation during which the prospects sorted out in the editing phase will be considered. In fact, after editing only attainable options will survive and the prospect with the highest value will be selected. The operation of these two phases is supported by the derivation of value function that is based on an accepted reference. The function for gains (risk-averse) is typically concave and convex for losses (risk-taking). The slope of change is steeper for losses than for gains.

Newman (1980) explained how academicians, practitioners, and policymakers are influenced by the Prospect Theory. He contended that Utility Theory is deductive (based on an explicit set of axioms) whereas PT is inductive (based on observations of behavior). Newman (1980) further added that utility theory and prospect theory predict different values of information. "More" information is not necessarily preferred to an agent who behaves according to PT.

In sum, assuming one will not consider the prospect of attaining the reward is likely oversimplifying the reality. Nonetheless, the tendency of risk averse for gains while risk taking for losses suggest that the amount of information to be rendered through an incentivization scheme would be contingent on the risk attitude of the contractor.

Self-efficacy theory

The self-efficacy theory (SET) was first proposed by psychologist Bandura (1977, 1993). One who has self-efficacy would believe that he has the capacity to carry out a task in a way that will achieve the specific goals. The concept of self-efficacy has been applied in many contexts and it is considered essential for performers of incentive schemes. Notably, Bonner and Sprinkle (2002) examined what matters in a monetary incentive-effort-performance relation and found there are three elements of self-efficacy: skill, task, and environment.

Capability can be affiliated with the direct skill possessed by the task performers. Incentive only works for those having the necessary skill for the job. If they lack the skill needed for a given task, their performance will be invariant irrespective of what incentives are offered. Indirect skill is perceptive and may work in a more subtle manner. For example, when one does not perceive having the skill, one would simply stay away from the job. The task itself is also critical. Task complexity will affect how one perceive whether completing the job is feasible. Faced with complex tasks, providing more details can support realistic assessment of one's ability to perform. Thus, in formulating incentives, the tasks and goals must be clear. Only when the performer is convinced that he has the skill to handle (including developing strategy) the complex tasks, the incentive-effort-performance relationship can be attenuated. The third element is the environment and covers all the conditions, circumstances, and influences surrounding the performer. Obvious examples include time pressure, assigned goals and feedback. To get the performer motivated, raising self-efficacy can be an effective means. Task complexity can be handled with greater efforts to improve the clarity of the details. Formulating targets jointly would accord opportunities to tune the task to a manageable scale. Mutually agreed goals and hence performance targets would positively engender committed efforts (direction, duration, and intensity). Another implication on incentive design is the need to establish feedback mechanism to enable learning.

Self-determination theory

Ryan and Deci (2000a, 2000b) proposed the use of Self-determination theory (SDT) to describe human's innate growth tendency and psychological needs. SDT seeks to explain the motivation of behind one's choices if there is no external influences and distraction. Under SDT, human behaviours are self-motivated and self-determined. It can therefore be said that SDT is a humanistic theory. SDT projects that there are three psychological needs to be satisfied should proper functioning is desired. SDT (Ryan & Deci, 2000a, 2000b, 2017) elaborated that human function depends on satisfaction of three basic psychological needs: autonomy, competence, and relatedness.

Based on a meta-analysis on drivers of performance, Cerasoli and Nassrelgrgawi (2016) found that autonomy, competence, and relatedness are pillars of motivated performance. Autonomy energies performance because it reflects the most basic intrinsic desire of humans to be his own agent of the environment. Autonomy is almost synonymous to self-determination; its satisfaction signifies one has control

over his own behavior. The associated sense of freedom of choice is pivotal to commitment to perform. The second pillar is competence. Satisfying the psychological need of competence means one is always in favor of demonstrating one's ability, and hence endorsement. Competence. Under SDT, the drive to satisfy competence need predicts enduring efforts to make sure the tasks are performed. As a matter of fact, demonstrating one's ability is fundamentally satisfying. Motivated individuals would confront challenges and feel proud for the skill he possesses to get the job done. Giving proper and timely feedback from a credible source will positively reinforce competence. Relatedness needs address the affective side of human desire of being emotionally bonded and recognized by other affiliates.

Turning now to performance that is conventionally treated as a homogenous, unidimensional construct. This is rather problematic in construction contracting because performance in construction projects is rarely unidimensional. Construction project tasks can categorically be identified as quality or quantity type. Quality-type tasks are those requiring attention to detail, personalization, and careful craftsmanship. Performance indicators thus include creativity, lack of errors, artistic value, and originality etc. Quantity-type tasks are typically repetitive, depend on rote skill, and tend to require less personal investment. These tasks are not offering high level of autonomy and interpersonal facilitation. Thus, the respective indicators include assembly time, quantified output criteria. Performance of quantity-type tasks can better be predicted by incentives while quality-type tasks are more likely to be predicted by factors such as intrinsic motivation and enjoyment. Conventional construction incentives primarily treat construction works as quantity-type. This may as well one of the major drawbacks because quality-type of tasks have proved to be the real challenge as far as project performance is concerned.

Under SDT, those who perceive the three psychological needs are met will outperform those who perceive otherwise. Need satisfaction is a more proximal outcome of incentives and mediates the relationship between incentives and intrinsic motivation. Moreover, mere presence of incentive has little impact on relatedness need. SDT extends the well-established positive link between incentives and performance by showing that need satisfaction and incentives play a joint role in performance improvement. The mere presence of incentives has little to no impact on the degree to which need satisfaction is addressed. The key is making tasks associated with an incentive to embrace autonomy, competence, and relatedness. In this way, both quality and quantity type of tasks can be covered. Emphasizing ownership is a useful way to promote autonomy. Intervention to bolster the need for competence include enabling individuals to get involved in the setting of goals. The very act of setting, striving for, and attaining a goal has a strong impact on perceptions of competence and self-efficacy; both are supposed to have positive impact on performance. As for relatedness, providing feedbacks makes individuals feel more respected. Furthermore, the 'game' must be fair. Perception of injustice impact organizational commitment, turnover intentions, satisfaction, and well-being.

Table 3 An integrated framework for CI design

Theory	Basis	Implications on CI	CI design
Utility Theory (UT)	Utility Maximising Individuals	Net Gain of real possibility	• Clear goals • Real and tangible benefits • Compensate diminishing returns
Principal-Agent Theory (PAT)	Self-interested Principal and Work-averse Agent	Address conflict of interest and asymmetrical information	• Aligned goals and risk preference • Performance observability
Prospect Theory (PT)	Non-rational agent	Expected utility for gains (risk averse) is less than the same quantum of losses (risk taking)	• Agreed targets and rewards • Input from performers
Self-Efficacy Theory (SET)	Ability to perform	Clear goals and target to effect efficacy	• Clear goals • Feedback on performance
Self-Determination Theory (SDT)	Satisfaction of psychological needs of autonomy, competence, and relatedness	Embracing elements of the three psychological needs	• Autonomy to perform • Ability to perform • Appreciation of performance

5 Construction Incentivization in Perspective

This section consolidates the theoretical suggestions deliberated in Sect. 4. An integrative framework is proposed and then followed by an operationalisation of the framework.

5.1 An Integrative Framework for CI Design

Drawing on the theoretical constructs on performance, the following Table 3 presents an integrated framework for CI design.

5.2 Operationalizing the Integrative Framework

To operationalize the conceptual underpinnings of the incentivization to design parameters Table 4 is prepared. Goal, Risk, Reward and Evaluation have been identified with due reference to the case study on construction incentivization conducted

Table 4 Design specificities respective to theories

Design Parameters	Design Specificities	UT	PAT	PT	SET	SDT
Goal	Clear goals	X			X	
	Aligned Goals and risk preference		X			
	Agreed targets and rewards			X		
	Input from performers			X		
	Autonomy to perform					X
	Ability to perform					X
	Composite arrangements	X				
Risk	Aligned goals and risk preference		X			
	Autonomy to perform				X	X
	Ability to perform				X	X
Reward	Real and tangible benefits	X				
	Compensate diminishing returns	X				
	Agreed targets and rewards			X		
Evaluation	Performance observability		X			
	Feedback on performance				X	
	Appreciation of performance					X

by Zhu et al (2020). Against these design parameters, design specificities suggested by the five theories are arranged. Since there are inevitable overlapping, Table 3 is prepared to illustrate the relationships among design parameters, design specificities and the theories.

With reference to Table 4, a design for CI is proposed. Table 4 gives the design specificities under each of the paraments together with the respective reference to theories. It is noted that there is more than one theoretical contribution to the design parameters.

Goal: Establishing goals is probably the first item to be settled for any incentive arrangement. All incentive schemes must have certain goals in mind. Both UT and SET have pointed to the need to have clear goals to serve as the criterion to weight up options. According to the goal-setting theory (Locke and Latham, 1990), goals must be meaningful, specific, challenging, and acceptable to the participants. These requirements nicely sum up the suggestions on goals by other motivating theories. For example, PAT suggests that it is imperative to have the meaningful goals aligned among the stakeholders. These goals must be attainable, thus conform with the project of ADT that the performers must have the ability to achieve the goals. In this connection, the goals should be translated to unequivocal tangible targets. Notwithstanding, two more considerations are suggested. First, the performers should be accorded the freedom to choose the methods to accomplish the targets. Second, to overcome the issue of diminishing returns on utility against rising rewards, composite arrangements like mingling time, cost, and schedule targets can be used to keep the efficiency of the performers at high level.

Risk: An interesting question about the use of incentive is whether the performer is given reward for what she has already contracted for? Paradoxically, if the incentive targets are just what the original contract requires, an CI is serving the function of adjusting the contract terms. This may not be desirable. However, if extra risks are involved, the adjustment will then be legitimized. Thus, PAT explains well the need to link the goals with the risks. It is most likely that the performers are asked to tackle unanticipated risks. To stimulate them to render extra efforts, the risks must be well articulated with the goals of the CI. In this way, the performer will be able to assess their ability to take on the risks at their own course.

Reward: The third design parameter is the reward for the performer. First and foremost, the reward must be commensurate with the risks to be undertaken. Reward must be genuine and material to the performers. The criterion for the reward should also be clear and the fulfillment or otherwise should not create dispute. All these should not be unilaterally decided. Instead, like targets, rewards should also be developed with input from the stakeholders. It is not uncommon that composite incentive arrangements are used in construction projects. Instead of treating different forms of targets as discrete, thoughtful combination of same may offer a unique way to alleviate the issue of diminishing returns of singular target.

Evaluation: Most CI users are only concerned with targets are met. This short-sighted approach will lose the opportunity to improve the performance observability that is considered vital under PAT to curb opportunism. Furthermore, both interim and final feedback should be incorporated to refine the CI. Interim feedback is suggested by SET to reinforce performers to keep the motivation momentum. Feedback on final achievement offers invaluable learning opportunities to upgrade the CI system as well as strengthening of performers' capacity. Feedback can also be a form of appreciation that would be treasured by believers of SDT.

5.3 Discussion

Whether the four observed conventional practice of CI design meet with the aforementioned CI prerequisites has been examined. First, unilaterally determined CI runs the danger that the recipients not fully committed to the goals of the CI. Almost all theories discussed in Sect. 4 point to the need to have goals and targets of CI agreed with the stakeholders. Ideally, the goals should be discussed with the aim of developing mutually accepted targets. Open discussion over targets also accords the opportunity in exploring the implications arising from the 'extra' risks to be handled. Another downside of imposition is non-commitment. Sometimes, the CI may have been agreed and signed, but there is no guarantee that the performer will deliver with their best efforts. The commitment issue is also highlighted by PAT.

Second, singular use of quantitative targets for administrative convenience can be problematic. Metric identifications criteria will assist the performers to evaluate if they have the necessary ability to fulfil their promises. Interim feedback can also be facilitated. Thus, there are good reasons to support the use of quantitative targets.

The major critique of the quantitative approach is ignoring the efforts in dealing with the tasks that may be in vain due to uncontrollable circumstances.

Third, recognising effort for reward can be controversial because of the difficulty in evaluating effort. Most project participants would consider they have put in utmost efforts irrespective of the outcome. In other words, it is quite unlikely for contracting parties to admit that they have not directed efforts to perform. Moreover, in high-risk ventures and when innovations are the key, efforts beyond mere competence are needed. The courage in taking the risk in facing potential loss of resources should the anticipated innovation does not materialise must be carefully crafted in a CI. Otherwise, it is very unlikely CI participants would put in the necessary resources.

Fourth, the conventional CI packages are not based on recognised performance motivators. Section Four listed five theories that make valuable suggestions on what would motivate or discourage performance. It is also a fact that there is no universally applicable CI package. Every CI should cater for the need of the project concerned. Moreover, there are certain fundamental issues like the four design parameters listed in Table 4 that every CI designer should go through in formulating an incentive package.

Accordingly, the followings are suggested for the planning of CI:

- The scope of the CI should be jointly formulated by the major stakeholders.
- The CI targets should be agreed by the initiator and the performers.
- Both 'carrot' and 'stick' can be used as deemed appropriate.
- CI can be used ex post to address ex ante unidentified risks.
- CI should embrace elements of behavioral performance.

CI can be an invaluable instrument to review what have not been contemplated ex ante. Under those circumstances, the contractor is required to go beyond what has been contracted for. It is suggested that this would mean CI is asking for something more than that have already contracted for. In fact, extra effort beyond mere competence should be aimed for. In this respect, Meng and Gallagher (2012) conducted a questionnaire survey in the United Kingdom and the Republic of Ireland to analyse the relationship between the use of incentives and the performance of a project. In general, improvements in time and quality could be tracked for projects with incentive schemes incorporated. Moreover, it was also found that 'extra' efforts were the real ultimate element of success.

6 Summary

This first chapter of the volume seeks to put construction incentivization in perspective. In this respect, five theoretical bases of construction incentivization are examined. These are utility theory, principal-agent theory, prospect theory, self-efficacy theory and self-determination theory. Accordingly, design specificities are suggested. In addition, typical incentive arrangements used in Hong Kong were studied. Four key observations were obtained: (1) unilateral formulation by the initiator; (2) only

quantified outcome targets are used; (3) only final outcomes count; and (4) no clear motivator can be identified. It is suggested that effective CI should give due consideration of the design specificities suggested by the afore-mentioned theories. This study conceptualises these findings by proposing four key CI design parameters: Goal, Risk, Reward and Evaluation. Goals of CI should be clear and genuinely agreed by the stake holders. CI should not be used to compensate probable under provision for what had been contracted for. Instead, unanticipated ex ante risks are the subject matters of CI. The undertaking of these risks should be within the ability of the performer who should also been given the autonomy over the way to handle the risks. Likewise, the reward must be real and attainable. Positive feedback, both interim and final, will positively reinforces the commitment of the performers to go beyond mere competence in accomplishing the goals.

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