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# Moderators of the Impact of Extrinsic Incentives on Knowledge Sharing – A Literature Review

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Bachelor Thesis

*“It’s funny how money changes situations.”*

Lauryn Hill – Lost Ones

Johann Mathis Dührsen

Faculty of Psychology and Neuroscience, Maastricht University

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## Abstract

There have been contradicting findings on whether extrinsic incentives increase knowledge sharing behaviour. Three moderators were evaluated as to whether they can help explain the findings. Performance type has, from a limited number of studies, yielded mixed evidence which is slightly in favour of it having an impact. Motivation crowding has received more supportive than opposing evidence, but also only from a small amount of research. Finally, performance salience of rewards has only been suggested by a meta-analysis, and not been tested in knowledge sharing studies, but offers a compelling explanation of some study-results and why the other two moderators impact the incentive-performance relationship. Practitioners are advised to take the three moderators into account when implementing incentives to promote knowledge sharing. Future research should overcome construct-validity issues of intrinsic motivation and include mediators for deeper insights. Overall, findings support the notion that assuming rewards to always increase behaviour frequency is simplistic.

*Keywords:* knowledge sharing, rewards, incentives, intrinsic motivation, extrinsic motivation, motivation crowding, performance salience, performance criteria

## Introduction

Knowledge sharing is the “process through which explicit or tacit knowledge is communicated and appropriated to other individuals.” (Schwartz & Te’eni, 2011, p1418). In organisations, it happens in an immense variety of conditions: From coincidental informal interactions to formalised reports, from face-to-face group meetings to chat-threads in digital knowledge repositories. Knowledge sharing is an essential part of knowledge management, which are the actions an organisation takes to use knowledge to reach its goals (Holsapple, 2013). It happens with almost every word spoken, yet its quality is the knowledge management element most likely to deteriorate (Hutzschenreuter & Listner, 2007).

This is cumbersome, since knowledge sharing is relevant to the performance of companies (Grant, 1996). Shared knowledge has more impact than unshared knowledge, not only because more people possess it, but also because of synergistic effects of knowledge combination (Chou & Tsai, 2004) that follow. Companies’ problem-solving capacities are positively influenced by it (Chow et al., 2008) and it reduces recurrent mistakes (Weick, 2011). The impact of knowledge sharing is illustrated by Babcock (2004),

who estimates that its improvement could save Fortune 500 companies 37 billion dollars a year.

Companies therefore try to increase knowledge sharing. This is often done by introducing extrinsic rewards like money or positive evaluations. Implementing rewards cost organisations substantial amounts of time and money. But the simple assumptions that a rewarded behaviour will occur more often does not seem to hold: Numerous studies examining extrinsic rewards have come to contradicting conclusions on whether they promote knowledge sharing (Wang & Noe, 2010). Some studies found no effect of rewards (e.g. Jin Chang, Pao Yeh & Yeh, 2007), others did (e.g. Shoemaker, 2016) and still others observed effective and ineffective rewards in the same experiment (Hung, Durcikova, Lai & Lin, 2011). These results may be due to significant variations between studies, such as different types of reward. Previous studies featured rewards awarded to individuals and to groups, monetary and non-monetary rewards (e.g. grades), as well as tangible and intangible rewards (e.g. public recognition). Likewise, knowledge sharing was researched in a variety of contexts such as electronic and face-to-face settings, with explicit and implicit knowledge being shared, and with performance dependent on quality or quantity of knowledge. Given this diversity of variables and environments, it is possible that the difference in results is due to moderators acting on the reward-performance relationship.

This paper therefore sets out to advance the discussion as to which, if any, variables moderate the efficacy of rewards. Based on present findings, it is argued that three potential moderators are worthy of future investigation: the performance type (quality- or quantity dependence of performance), the performance-salience of rewards, and the motivation crowding effect. For this purpose, first the evidence for each moderator is reviewed. Secondly, the discussion section will elaborate on several methodological issues, implications for future research, and possible explanations for the observed results.

### **Review of Moderators**

To find potential moderators, an unsystematic literature search was conducted and two factors, performance type and motivation crowding, were found to have a sufficient amount of studies to be evaluated. A third factor, performance salience of rewards, was included due to it maybe being a mediator of performance type and motivation crowding and therefore possibly illuminative for how rewards affect performance in knowledge sharing.

### **The influence of Performance Type on Reward Efficacy**

The first potential moderator of the incentive-performance relationship of knowledge sharing to be examined is how performance is defined. Performance criteria differ in how much they emphasise quantity or quality: Quantity-dependent tasks, such as for example finding animals that start with a certain letter, involve clearly measurable goals, and performance on these tasks varies based on how frequently they are attained. Conversely, when a task is given quality-dependent criteria, results vary along a spectrum of value or intensity. Writing a humorous novel would be exemplifying for this category. Knowledge sharing tasks differ in whether their performance is quality- or quantity-dependent. In the following, findings about the impact of incentives on quality- and quantity of knowledge sharing is reviewed.

Cerasoli, Nicklin & Ford (2014) investigated performance type as a moderator in their meta-analysis about the impact of extrinsic and intrinsic motivation on task performance. The studies used were not specifically knowledge sharing studies, but from diverse work, school and physical settings. Intrinsic motivation was defined as “the participation in an activity because it was intrinsically enjoyable, or as task fulfillment” and extrinsic motivation as participation due to task-external consequences of participation. The authors found support for the proposition that intrinsic motivation better predicts quality-dependent performance and extrinsic motivation better predicts quantity-dependent performance. Based on those results, quantity-dependent knowledge sharing would be predicted to be more so influenced by changes to extrinsic than intrinsic motivation, and quality-dependent knowledge sharing more so by changes to intrinsic motivation.

A small amount of studies which will now be reviewed measured knowledge sharing rates and quality and quantity of performance. Their findings tentatively suggest that the performance-type dependent impact of incentives extends to knowledge-sharing tasks. Results most congruent with this hypothesis were found by Liu, Liang, Rajagopalan & Sambamurthy (2011). In their study, two online-communities were offered a monetary incentive to assess its effects on knowledge sharing. On average, incentivised community-members had a higher quantity of sharing, but the quality did not change. Slightly more nuanced results were found by Wang, Noe & Wang (2011). They introduced different incentive schemes together with the start of the use of an electronic knowledge management system in a Chinese company. The first incentive, informing employees that their knowledge sharing behaviours would be part of their performance evaluation, led to an average increase in both quality and quantity of contributions. The second incentive, a version of the latest cell-phone to be awarded to the top thirty percent of performers, increased quantity significantly and quality well-nigh significantly. Thus, two out of the three so-far mentioned incentives had

a stronger effect on quantity of performance, congruent with the propositions of Cerasoli et al. (2014). The impact on quality was not uniform: In one case quality of performance decreased non-significantly and in the other two it increased non-significantly. A conceptually similar study found results that can be interpreted to be in line with the prediction of a differential effect of performance type and is therefore worth mentioning. Wang, Clay and Forsgren (2015) investigated the interaction of task complexity and motivation type for knowledge sharing tasks with a survey. For complex knowledge sharing tasks, intrinsic motivation was positively associated with frequency of knowledge sharing, and extrinsic motivation negatively. Execution of mundane knowledge sharing tasks however was positively related to extrinsic motivation, and intrinsic motivation was not. Under the assumption that complex tasks are more likely to be quality-dependent and mundane tasks more quantity-dependent, these results also support performance type as a moderator of the efficacy of extrinsic rewards. Not in line with the predictions based on Cerasoli et al. (2014) were the results of an experimental study using groups of Taiwanese university students. Hung et al. (2011) conducted a brainstorming task and incentivised participants with a monetary reward for the top knowledge contributors and a reputation feedback procedure, which involved a public ranking of participants based on their contributions in seven-minute intervals. The monetary reward affected neither quantity nor quality of contribution, and the reputation feedback procedure affected both positively.

Out of the four studies addressed, Wang et al.'s (2011) possesses the highest evidentiary force due to its realistic setting and good measurement method: It was conducted in a real-life corporate setting, and assessed quality and quantity of contributions with expert ratings. Liu et al.'s (2011) study is of similar quality, having been conducted in an online community for professionals, and with quality ratings by knowledge seekers. The two remaining studies are slightly less informative given that Wang et al.'s (2015) assessment of performance type via task complexity is an assumption and they measured via self-report. Compromising for Hung et al. (2011) is that they used student participants and had no long-term observation of the impact of rewards: This is potentially problematic, since Huysman & de Wit (2002) report that the impact of rewards can have a temporal profile: After an initial rise, response to the reward drops. Another design-aspect of Hung et al. (2011) that questions the validity of their results is that their reputation feedback occurred every seven minutes, possibly becoming much more salient than the monetary reward and thereby limiting the impact of it. Further, such a high frequency of giving reputation feedback would not be found in many, if any, real-life settings.

One of the two more informative studies (Liu et al., 2011) and one of the two less informative studies (Wang et al., 2015) showed results in line with the predictions of a differential effect of incentives, having observed extrinsic incentives to have a stronger effect

on quantity of performance than on quality of performance. Equally, one more informative study's (Wang et al., 2011) and one less informative study's results (Hung et al, 2011) are not in line with these predictions. Technically, Wang et al. (2011) observed that the gift-reward affected quality non-significantly and quantity significantly, but the difference between the two changes is in itself not significant ( $p < 0.10$  vs  $p < 0.05$ ). This difference in labels is caused by the arbitrary setting of the significance level at 0.05. The incongruent results of the study might however also have occurred because intrinsic motivation, which according to Cerasoli et al. (2014) affects quality more than quantity, was increased in all conditions: In the study design, managers informed all employees about the high value of knowledge sharing before beginning the experiment. Awareness of the value of knowledge to other employees and the company would conceivably affect altruism, an intrinsic motivation source. Hence the incentives may have increased quantity more than quality and the value-communication may have, by raising intrinsic motivation, increased quality more than quantity. This may ultimately have led to both quality and quantity of contribution rising significantly.

To conclude, given that the two studies supporting the differential effect of incentives on performance type have fewer flaws than the two studies with incongruent results, it is tentatively indicated that the effect observed by Cerasoli et al.'s meta-analysis is also present in knowledge-sharing scenarios. But it must be noted that Liu et al. (2011) used real-money payments as incentives, while Wang et al. (2011) used accountability in employee evaluations and a gift-reward. This difference in rewards is another possible source of the differences in results.

### **The influence of Performance Salience on Reward Efficacy**

A second potential moderator of the incentive-performance relationship is how salient the incentive is during performance. Although for this review no knowledge sharing studies could be found that manipulated this moderator and can thus confirm its influence in knowledge sharing settings, it is worth mentioning because relating it with the two other factors does potentially aid in understanding their mechanisms and allow research recommendations to be made.

In their meta-analysis, Cerasoli et al. (2014) differentiate between directly performance-salient incentives (DPS) and indirectly performance-salient incentives (IPS). DPS incentives are linked closely and in a straightforward manner to performance ("if-then-rewards"), for example piece-rate payment schemes. IPS incentives, in opposition, have a more inexplicit link to performance. Cerasoli et al. (2014) give the example of base-rate

salaries: Good performance may increase the base-rate salary due to promotions, but this incentive is less immediately and less reliably linked to current performance. The authors found that under IPS incentives, intrinsic motivation had a stronger relationship to performance than under DPS incentives: How much a gain in intrinsic motivation translates to a performance gain is influenced by how performance-salient the rewards are. Hence, if it is known that for a given task intrinsic motivation has an impact on performance, then the impact of an extrinsic incentive may be stronger if it is more IPS. The following section will elaborate on the third moderator of the reward-performance relationship, to further illuminate why rewards have not consistently been found to promote knowledge sharing.

### **The influence of Motivation Crowding on Reward Efficacy**

Apart from performance type and performance salience of rewards, one further factor may constitute a relevant variable that needs to be taken into account by practitioners who aim to promote knowledge sharing. The conscious perception of being rewarded for an activity can possibly change how an agent perceives the activity and interacts with it. A specific case of such an interaction is motivation crowding. Motivation crowding theory describes the phenomenon that the introduction of extrinsic incentives can sometimes lower an agent's intrinsic motivation for a task (e.g. Frey & Jegen, 2001). This may lead to a worsening of performance, contrary to the intended purpose of the incentives. The process, also named "undermining effect" has been investigated by several meta-analyses. There has been some disunity: Some scholars interpreted previous research to not support the existence of motivational crowding (e.g. Cameron & Pierce, 1994, Eisenberger and Cameron, 1996) while others did (e.g. Deci, Koestner & Ryan, 1999). Both sides agree though that "crowding out" of intrinsic motivation by extrinsic incentives, if present, does not seem to be a universal effect, but appears to vary depending on factors such as the type of reward and the context in which it is given (Gneezy, Meier & Rey-Biel, 2011).

Unsurprisingly, different hypotheses have been developed of how, and therefore when, motivation crowding happens. Three of these will be shortly summarised to later allow synthesis of results of motivation-crowding research with other findings. The first account, which has been investigated in a knowledge sharing setting (e.g. Wang & Hou, 2015), is based on cognitive evaluation theory (Deci & Ryan, 1980). It is part of self-determination theory (SDT), which aims to explain human motivation. To explain how agents' intrinsic motivation reacts to extrinsic incentives, it is proposed that agents perceive two informational features of rewards: whether the reward aims to control the agent, and whether the reward signals positively about the agent (e.g. regarding competence), meaning the reward is perceived to be merit-based. A perception of a reward as controlling would lead to "crowding

out”, meaning a decrease of intrinsic motivation. Conversely, a perception of it as competence-signalling would produce “crowding in” of intrinsic motivation.

A competing account of motivation crowding is the overjustification hypothesis (e.g. Lepper, Green & Nisbett, 1973), which is based on self-perception theory. According to self-perception theory, under some circumstances people infer their attitude to an activity based on their own previous actions or the circumstances under which those actions were taken. Thus, individuals who recall being rewarded for a previous action and perceive this, may infer their attitude based on the reward, and not attribute it to the originally present intrinsic motivation. Subsequently, they expect the behaviour not to be intrinsically rewarding in the future and the frequency of execution sinks.

An animal experiment by Reynolds (1961) observed a learning bias that may be at the core of this phenomenon. In the studies two pigeons learned that pecking on a key displaying a red triangle sometimes led to a food reward. Afterwards, two keys, one with red colour and the other with a triangle, the two stimuli-characteristics which had been combined before, were displayed. The two pigeons each chose a different key, indicating that they had attended to different characteristics while learning. Reynolds (1961) offers the explanation that learning about one aspect of a predictive stimulus can block the learning of other aspects of that stimulus which are just as predictive. Transferring this to the context of self-perception theory, it is conceivable that learning about the external reward of a behaviour blocks learning or atrophies previously learned information that the behaviour is also intrinsically rewarding.

A third account of why motivation crowding occurs is based on behaviourism. Dickinson (1989) suggests that the intrinsic motivation of an action is due to anticipation of social praise. Often social praise is higher when a behaviour occurs without extrinsic rewards, because then it signals altruism. The presence of an extrinsic reward could therefore lower the feeling of reward upon execution of an action. This account would matter especially in social situations, and could therefore be stronger for knowledge exchange of implicit information, the transfer of which involves time-intensive face-to-face contact and is therefore a more strongly social process.

Additionally, some variables that are not included in specific theoretical accounts have been noted to moderate the strength of motivation crowding: whether rewards are monetary or non-monetary and how they interact with social motivations (Gneezy et al., 2011) whether they are known in advance and expected (Deci et al. 1999), and whether they are salient during task engagement (Cerasoli et al. 2014).

The motivation crowding effect has been proposed to explain the changing efficacy of extrinsic rewards in promoting knowledge sharing (e.g. Tong, Wang & Teo, 2007; Kettles,

St.Louis & Steinbart, 2017). So far, few studies have investigated this. Their findings are with one exception, compatible with predictions of motivation crowding theory.

Of the here reviewed studies, the most compelling results in support of motivation crowding were obtained by Liu et al. (2011). The authors measured intrinsic and extrinsic motivation before and four weeks after introducing monetary rewards for knowledge sharing in two online communities. As predicted by motivation crowding theory, the intrinsic motivation of participants decreased significantly after the treatment. The extrinsic motivation did not change, and neither did knowledge sharing intention. Notably, the relation between intrinsic motivation and knowledge sharing underwent a strong change: before the treatment the correlation was positive ( $r=0.58$ ), afterwards negative ( $r=-0.23$ ). Meanwhile, the extrinsic motivation-knowledge sharing intention correlation increased from  $r=0.3$  to  $r=0.94$  across treatments.

A second study that investigated motivation crowding from the perspective of SDT observed the predicted drop in performance, but only partially the predicted cause of it, the decrease of intrinsic motivation (Wang & Hou, 2015). SDT proposes that motivation crowding occurs when an extrinsic incentive is perceived as pursuing to control an agent, in opposition to the agent's self-determination. Therefore, the more a reward is detrimental to a perception of self-determination, the more it will elicit "crowding out". The survey differentiated how much rewards were perceived so: SDT extends the extrinsic-intrinsic dichotomy of motivation for an action with four subtypes of external motivation, each increasingly more self-determined. The differentiation occurred between rewards that fall into the most un-self-determined category ("hard rewards") and the next more self-determined category ("soft rewards"). The soft rewards were hypothesised to have a more positive effect on knowledge sharing behaviour. This was found to be the case: soft rewards had a stronger relationship with knowledge sharing behaviour than hard rewards ( $p<0.01$  vs  $p<0.05$ ), but whether this difference was significant was not reported. To test the proposed mechanism of motivation crowding, the decrease in intrinsic motivation, two components of intrinsic motivation were measured by self-report: "altruism for personal satisfaction" and "altruism for organisational benefit". According to the SDT account of motivation crowding theory, hard rewards should have a more detrimental effect on the two measures of intrinsic motivation than soft rewards. This hypothesis was partly confirmed: while soft rewards affected both intrinsic motivation measures positively, hard rewards affected one measure positively and the other non-significantly. To summarise, the reward-performance relationship is as proposed by the SDT's account of motivation crowding, but the internal mechanism behaved only partly as predicted for two altruism sub-scales of intrinsic motivation.

A third study investigating motivation crowding in knowledge sharing behaviour found conforming results but did not measure intrinsic motivation. Minbaeva (2008) used a different

approach to detect motivation crowding than the other studies. The author measured human-resource management practices (HRPs) hypothesised to affect extrinsic and intrinsic motivation with a survey in subsidiaries of Danish multinational companies. Extrinsic motivation-oriented HRPs had a positive effect on knowledge sharing, intrinsic motivation-oriented ones non-significantly so. But the interaction factor of extrinsic- and intrinsic motivation-oriented HRPs had a negative effect on knowledge-sharing behaviour, as measured by the intra-company knowledge exchange. This is counter-intuitive, since it would normally be expected that two types of motivation have additive effects, not a negative interaction. Motivation crowding could possibly explain this result: if the extrinsic incentives crowded out intrinsic motivation, a knowledge sharing rate below what is predicted by the two main effects of extrinsic and intrinsic motivation would result, constituting an interaction effect. It has to be mentioned though that Minbaeva's (2008) operationalisation of intrinsic motivation is substantially different from other studies: Motivation was not asked for directly in questionnaire items but was inferred from the presence of hypothesised intrinsic motivation-increasing HRPs. To illustrate, questionnaire-items concerning intrinsic motivation targeted for example work satisfaction: *"We use flexible working arrangements—such as flexitime, job sharing, and part-time work—to best accommodate individual working arrangement preferences"*. Another difference is that none of the items concerning HRPs mentioned knowledge sharing-related HRPs directly, so the study inspected the presence of extrinsic/intrinsic motivation-promoting HRPs, not practices specifically targeted at knowledge sharing. Since extrinsic and intrinsic motivation were not measured directly, inferring a decrease in intrinsic motivation from a decrease in performance is only hypothetical, making a confirmation of the internal mechanism impossible

An intricate knowledge sharing study that found results fitting the motivation crowding model, but also some null-results, focused on digital behaviour. Again, the internal mechanism of motivation crowding could not be validated. Kettles et al. (2017) did not measure intrinsic and extrinsic motivation but hypothesised an interaction between them in their experiment. In an information-seeking task performed in an internet browser, they varied presence and type of salary for knowledge sharing and measured knowledge sharing rates. Participants had a limited amount of time to retrieve information and were paid either a fixed salary for the time-span or a piece-rate salary, meaning they were paid per unit of information retrieved. Kettles and colleagues (2017) hypothesised that participants who were paid a piece-rate salary would be reminded by payment that they are acting against their own interest when sharing knowledge due to time loss. Thus, they should feel controlled, which according to SDT would lead to "crowding out" of intrinsic motivation. Therefore, piece-rate pay should lead to a drop in knowledge sharing. Vice versa, for participants with a fixed salary, this economic loss and hence feeling of being controlled should not be present, but

the incentive interpreted as acknowledgement of beneficial behaviour. Hence a fixed salary should lead to an increase in knowledge sharing behaviour. To test these hypotheses, they chose participants who had rated knowledge sharing as important (KSI). The "crowding out" was not present in the (piece-rate pay x KSI) condition, but the "crowding in" effect was in the (fixed payment x KSI): knowledge sharing rates were higher than predicted by the main effects, the fixed salary and KSI. Notably, this synergistic effect yielded knowledge sharing rates that were twice as high than the average of all conditions. Thus, even though only one of the two predicted effects of motivation crowding was observed, the "crowding in" showed an effect strength that is relevant for real-life scenarios. Unfortunately, since intrinsic motivation was not measured, the assumption that the increase in knowledge sharing was caused by the crowding effect's hypothesised drop in intrinsic motivation is only hypothetical.

In summary, while Liu et al. (2011) and Wang & Hou (2015) found result-patterns matching the predictions of motivation crowding, only Liu et al. (2011) clearly observed the drop in intrinsic motivation, which Wang & Hou did partially. They were able to find tentative evidence in favour of the SDT account of motivation crowding though. Kettles et al. (2017) and Minbaeva (2008) observed knowledge sharing rates that were as predicted by the theory but could not validate the internal mechanism since changes in intrinsic and extrinsic motivation were not measured.

Two further studies are to be examined. One survey-study examining knowledge sharing did not yield findings congruent with motivation crowding theory: Andreeva & Sergeeva (2016) conducted a survey among Russian secondary school teachers, expecting that extrinsic motivation-enhancing HRP practices would go along with lower intrinsic motivation. Their data did not support this hypothesis. A notable finding was that, when opportunities to share knowledge were perceived to be high, intrinsic motivation significantly predicted knowledge sharing behaviour and extrinsic motivation did not do so. When perceived opportunities were low however, it was the other way around. The authors interpreted these outcomes to exemplify a situation in which high intrinsic motivation to share does not translate into much knowledge sharing behaviour. This may be a relevant observation, since Liu et al. (2011) found that in addition to an extrinsic incentive lowering intrinsic motivation, it also weakened the relationship between intrinsic motivation and knowledge sharing behaviour. This offers a different or complementary explanation how motivation crowding may affect knowledge sharing behaviour: Not by decreasing intrinsic motivation itself, but by decreasing the relationship of intrinsic motivation and knowledge sharing intention.

Lastly, the results of one scenario-based survey study question the validity of previous survey-research by finding evidence that participants report inaccurately on their motivations and their effects. Vilnai-Yavetz & Levina (2018) asked participants to self-report

to which extent extrinsic and intrinsic motivations would lead them to share commercial business content such as promotions on social networking sites, and afterwards measured in an experiment, with incentive-conditions that varied between intrinsic and extrinsic incentives, how much these motivation sources actually impacted subjects' sharing behaviour. Three different conditions were tested: Intrinsic motivation only, extrinsic motivation only, and both combined. A discrepancy was found between which motivations were declared to influence their behaviour and which eventually did impact it. Intrinsic motivations were reported more frequently than extrinsic motivations, but the experimental conditions with extrinsic incentives-only yielded more sharing behaviour than the intrinsic incentives-only condition. The authors point to the possibility of a social desirability effect leading to an overstatement of intrinsic motivations in the self-reports. Unfortunately, it was not discussed whether the effect played a role in their experiment. Other authors who measure intrinsic motivation with self-reports should document which measure they take against it or explore possibilities to detect its presence. Under the assumption that the results are free from this bias, they present a picture conforming with motivation crowding theory. Without this effect, it would be expected that the condition in which both motivation types were increased would see higher sharing behaviour. But the condition with both extrinsic and intrinsic incentives did not have more sharing behaviour than the extrinsic-incentive-only condition. This non-additive effect may be due to the extrinsic incentive crowding out the intrinsic motivation, but this cannot be proven since there was no post-measurement of intrinsic and extrinsic motivation. Both social desirability bias and motivation crowding effect may explain the results.

To summarise both supportive and critical studies: Result patterns fitting motivation crowding theory were observed: A drop of performance was seen in one high-quality study (Liu et al., 2011), and non-additive interaction effects with intrinsic motivation were observed in two studies: A survey-study of Danish multi-national companies (Minbaeva, 2008), and a scenario-based survey of online commercial content sharing (Vilnai-Yavetz & Levina, 2018). Mixed results were found in an experimental study of knowledge sharing during a digital knowledge retrieval task (Kettles et al., 2017). Only a survey of knowledge sharing behaviour in the special environment of Russian school-teachers found exclusively a null result.

The mechanism of motivation crowding, the decrease of intrinsic motivation, was clearly observed in the high-quality study (Liu et al., 2011). Mixed results were obtained by Wang & Hou (2015) who observed only one of two types of intrinsic motivation to be lower in relation to the condition which was hypothesised to elicit more motivation crowding. Lastly, Wang & Hou (2015) found support for the SDT account of motivation crowding.

In terms of evidentiary force, Liu et al.'s (2011) study stands out due to its better external and internal validity compared to the other studies: It was conducted with actual money rewards,

and over a period of four weeks. The only caveat to its external validity is that it did not occur in a setting with formal corporate practices, which is cumbersome since the relationship to authority may play a role for the crowding out of motivation. Since it measured knowledge sharing behaviour via observer-ratings and not via self-report, its internal validity is also superior to the four survey studies. The only study which did clearly not observe a decrease in intrinsic motivation due to extrinsic incentives was conducted under the special environment of secondary school teachers. Andreeva & Sergeeva (2016) point out that teachers usually operate under high levels of autonomy, which may explain why extrinsic motivation-enhancing HRP's do not have a strong effect on their perception of autonomy. The crowding out effect due to a perception of being controlled may therefore have been weakened below significance.

Overall it is thus concluded that motivation crowding for knowledge sharing behaviour has received more evidence in favour than against, but the amount of studies is very small. The observed contradictions could be due to the diversity of operationalisations and environments of the studies. Since motivation crowding has received more concrete evidence in other areas of professional performance (Frey & Jegen, 2000) and especially higher cognitive tasks (Ariely, Gneezy, Loewenstein & Mazar, 2009), investigating it further in organisational and knowledge-work environments is promising. For these investigations, social desirability bias needs to be addressed to avoid it as an alternative explanation.

## Discussion

Organisations would profit from understanding whether and when rewards increase knowledge sharing, because it has a large influence on organisational performance (Grant, 1996) and because there are monetary and opportunity costs of implementing rewards. Given that many previous research findings on whether rewards influence knowledge sharing have however contradicted each other, identifying moderators of reward-*efficacy* would aid successful implementation of incentive schemes. This paper has identified three factors that it argues moderate the reward-performance relationship: performance type (quality- or quantity-dependent), performance-salience of rewards and motivation crowding. Practitioners may want to monitor or manipulate these variables to ensure that incentives work as well as possible. The findings regarding the individual moderators are now summarised and their possible implications discussed, followed by general comments on the field of reward *efficacy* for knowledge-sharing.

The type of performance, quality/quantity-dependence, seems to affect the *efficacy* of rewards. Extrinsic motivation was observed to have a stronger impact on quantity-dependent

tasks and intrinsic motivation to be more important for quality-dependent tasks. Under the assumption that complex tasks are more likely to be quality-dependent and mundane tasks more quantity-dependent, this possibly implies task complexity as a moderator. Based on these findings it may be advisable that managers aiming to increase knowledge sharing take into account whether the intention is to increase the quality or the quantity of outcomes. For simple actions that do not have a wide range of quality, like reporting explicit information or feedback forms, extrinsic incentives may be more efficacious, while tasks with a wide quality range like problem-solving of organisational issues may not profit as much from external rewards. Considering that the transfer of implicit knowledge is more likely to be a task with a wide quality-range as compared to the transfer of explicit information, the type of knowledge should also be considered. The present research does not conclusively prove the differential effect of incentives. Future investigations should aim to keep the performance salience of the incentives equal when measuring performance of knowledge sharing tasks, since this factor may easily be a confounder.

The second factor indicated to moderate the impact of incentives is their performance-salience. When tasks have directly performance-salient incentives, the relationship between intrinsic motivation and performance is weaker than under indirectly performance-salient ones (Cerasoli et al., 2014). According to the authors, this may be so because directly performance-salient incentives compete more so with intrinsic motivation for being immediate driving factors of performance. Their meta-analysis did not examine knowledge sharing studies per se, hence it is not guaranteed that these findings extrapolate into this area. Practitioners aiming to promote knowledge sharing may thus prefer incentives with a softer performance-salience when the targeted task is heavily dependent on intrinsic motivation. This seems to be more so the case for quality-dependent tasks (Cerasoli et al., 2014).

Regarding the two concepts of performance type (quantity- or quality-dependent) and performance salience of the reward (direct and indirect) there is a possibility that they are conceptually similar or may correlate: A quantity-dependent performance, because it is more likely to be separable into chunks and non-ambiguously measurable, may more often have a directly performance-salient reward assigned to it. The creation of an univalent link between performance and reward, which is a defining characteristic of the directly performance-salient reward, is greatly facilitated by the performance being quantity-dependent. Vice-versa, rewards for quality-dependent performance would more likely be indirectly performance-salient, because precisely mapping rewards to quality of performance is likely harder due to several criteria being involved or their subjectivity. Under this assumption, future research should make sure to avoid confounding of these factors.

For the third potential moderator, there is some evidence for motivational "crowding out" to affect the link between incentives and performance due to incentives lowering intrinsic motivation or weakening the relationship between intrinsic motivation and knowledge sharing behaviour (e.g. Liu et al., 2011). The above examined studies did not clearly support an explanation of how motivation crowding occurs, therefore future studies should attempt to test specific accounts. Some previously discussed results however may support the overjustification account of motivation crowding: It proposes that a reward makes agents "forget" about how intrinsically motivating a task is; their attitude to the task is more so driven by the extrinsic reward. This fits with Liu et al.'s (2011) observation that, upon introduction of a reward, there was a decrease of the correlation between intrinsic motivation and knowledge sharing intention while the extrinsic motivation - knowledge sharing intention correlation increased. Further the overjustification account is a plausible explanation of why the performance salience of the reward affects the overall impact of the reward: The more performance-salient the reward, the more strongly it is on an agent's mind, and hence the quicker the agent would "forget" about how intrinsically rewarding the task is. As Cerasoli et al. (2014) describe, performance salience moderates the relationship between intrinsic motivation and performance. That the overjustification account fits well with these two findings gives it credibility. If salience of a reward impacts how much it drives behaviour, this might imply that extrinsic rewards can not only "crowd out" intrinsic motivation, but also other extrinsic motivation. This may have happened in Hung et al. (2011) where the highly salient public feedback-reward was highly significant, whereas the less salient monetary reward was not at all. It seems a benign observation that for a reward to influence a behaviour, it needs to be sufficiently strongly associated (i.e. classically conditioned) with the task. But given that salience may explain via unambiguous links why the performance type influences reward efficacy and via overjustification why motivation crowding does, it offers a compelling explanation why these factors are relevant: because they affect the conditioning process.

Given that several studies show results as predicted by motivation crowding theory, and there is to the author's knowledge no persuasive disproving study, it may be worthwhile for practitioners to address the effect. However, since no mechanism of motivation crowding is conclusively proven or strongly indicated by data, deriving concrete advice is likely premature. Given that SDT has received a profound amount of support from research and has been validated in a variety of settings, including corporate ones, taking actions regarding the SDT account of motivation crowding theory is unlikely to have negative consequences. This would include the reframing of rewards so that they are perceived as not infringing on personal autonomy and as feedback.

Apart from specific research recommendations for the investigated moderators, some global suggestions for knowledge sharing research can be made. Given that performance

type, (and therefore possibly task complexity), reward salience and motivation crowding seem to have an effect, future research should, where possible, try to manipulate or control these variables to confirm the findings for different settings of the other moderators. Without this measure, confounding of independent variables with these other moderators may occur. Studies that do not manipulate the named moderators should aim to use operationalisations of other studies to allow comparison. In addition to moderators, measuring the mediators between incentive and performance could yield important insights. To determine the presence of motivation crowding, extrinsic and intrinsic motivation should be measured. Additionally, to test the different accounts of motivation crowding, their proposed mediators could be assessed. For the three above-mentioned accounts the mediators would be the perception of how intrinsically motivating subjects perceive the task to be for the overjustification account, anticipation of social praise for the behaviourist account and perception of being controlled and a task as status-signalling for the SDT account. A further reason why insight into the mediators between incentives and knowledge sharing performance is valuable is a better understanding of interactions of Human Resource Practices (HRPs). This has been explained by Andreeva & Sergeeva (2016): In real-life organisational situations, there are almost always more than one HRP, which are often incentives, impacting on workers. Knowing their working mechanisms could help anticipate interactions between HRPs. When, for example, one HRP increases the perception of knowledge sharing being valuable, that might lead to a previously present reward for knowledge sharing as being regarded as inappropriately small. Such interactions of HRPs have been indicated by the results of Minbaeva (2008) and Andreeva & Sergeeva (2016).

Finally, an important validity issue for researchers is the inconsistent operationalisation of intrinsic motivation in the motivation crowding literature, which undermines the ability to compare studies and synthesise conclusions. It is therefore shortly elaborated on. Intrinsic motivation was sometimes measured based on sub-categories: Wang & Hou (2015) e.g. measured two types of altruism, whereas Liu et al. (2011) used the interest and enjoyment subscale of the Intrinsic Motivation Inventory. If one operationalisation includes social aspects of intrinsic motivation, and the other does not, they would likely be differently affected. Especially so, if the behaviourist account of motivation crowding is valid, which proposes the importance of social praise. A second problem is that some measurement items have appeared in questionnaires of both motivation types. For example, while Andreeva & Sergeeva (2016) had an item about considering knowledge sharing important in their intrinsic motivation-questionnaire, Liu et al. (2011) used it for extrinsic motivation. Confusion like this is maybe present because intrinsic motivation has no universally accepted definition (Oudeyer & Kaplan, 2008; Reiss, 2013). In the literature, Ryan & Deci's (2000) definition is most often used, which defines motivation as intrinsic when it is

derived from the task and extrinsic when it is derived from the consequences of the task. Authors therefore need to report in detail which definition and operationalisation they have used to secure construct validity. This example possibly underlines the need for abandoning the dichotomy of extrinsic and intrinsic motivation and adopt a spectrum as proposed in SDT (Ryan & Connell, 1985).

### Conclusion

This paper set out to advance the discussion whether there are variables that moderate the impact of incentives on knowledge sharing behaviour. The amount of research is humble, but it indicates performance type and performance salience of rewards as variables that need to be taken into account. The moderating effect of these variables makes it plausible to assume that several others do, too. If practitioners and researchers seek to learn how to promote knowledge sharing with incentives, they likely need to abandon the behaviourist paradigm that rewarded behaviours will always increase in frequency and adopt a more complex model of human motivation.

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*Somebody take me back to the days,  
before this was the job, before I got paid,  
Back when I was rapping for the hell of it,  
'cuz nowadays I'm rappin' to stay relevant.*

B.o.B – Airplanes