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The Influence of Network Externalities on Policy Diffusion Process

: Theoretical Exploration and Research Agendas

정책확산에 대한 네트워크 외부효과의 영향

: 이론적 탐색과 연구 아젠더를 중심으로

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목 차

Network externalities can significantly influence policy diffusion processes. However, previous policy diffusion studies have not considered the influence of network externalities that can occur during policy diffusion processes. Therefore, this study's critical contribution is that it provides theoretical foundations and a research model to more systematically and reasonably assess and address the dynamicity of policy diffusion related to network externalities that existing studies have overlooked. This study first incorporates network externalities into a policy diffusion process and builds a policy diffusion model

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consisting of three stages of policy diffusion focused on policy adoption: an initial stage, a consideration stage, and an adoption stage. The second section addresses the fundamental characteristics of policy diffusion. The third section suggests research agendas for future studies. The agendas emphasize the significance of policy decision makers' perception, information accessibility, soft organizing actions, dynamic diffusion modes, strategic network power, and transaction costs in the three stages of policy diffusion process. The authors hope that future studies will actively involve the systematic examination of network externalities' influence on policy diffusion.

□ Keywords : Policy Diffusion, Network Externalities, Strategic Network Power

네트워크 외부효과는 정책확산과정에 중요한 영향을 미침에도 불구하고 정책확산에 관한 기존연구들은 그것의 영향을 좀처럼 고려하지 않았다. 따라서 이 연구는 네트워크 외부효과를 정책확산 모델에 융합함으로써 기존연구들이 간과했던 정책확산과정에서 나타나는 역동성을 보다 풍부하고 체계적으로 설명/평가할 수 있는 이론적 기반과 단초를 제공하려고 한다. 이 연구는 먼저 네트워크 외부효과의 영향을 체계적으로 분석하기 위해서 정책확산 메커니즘에 네트워크 외부효과를 융합한 정책확산모델을 이론적 논의를 기반으로 구축하였다. 정책확산의 정책채택에 초점을 두고 정책확산을 세 가지 단계(초기단계, 숙고단계, 채택단계)로 구분하고 정책확산의 근본적 속성들을 설명하였다. 그리고 이 정책확산 모델을 토대로 정책확산에 대한 네트워크 외부효과의 영향을 체계적으로 분석하기 위한 중요한 연구 아젠더를 각 단계별로 이끌어내어 제안하였다. 이들 연구아젠더는 정책결정자들의 인식, 정보의 접근성, 전략적 네트워크 파워, 정책확산 메커니즘의 역동성, 거래비용의 중요성을 강조하였다. 저자들은 이 연구가 정책확산에서 네트워크 외부효과의 영향을 체계적으로 연구하는데 단초가 될 수 있기를 기대한다.

□ 주제어: 정책확산, 네트워크 외부효과, 전략적 네트워크 영향력

Introduction

Since Rogers (1962), Walker (1969), and Gray (1973) pioneered diffusion studies, in recent decades many scholars have studied policy diffusion. There has been wide agreement that policy diffusion is based on learning (Meseguer,

2005; Brown, 1998), competition which governmental officials or entrepreneurs lead (Mintrom, 1997; Moon & deLeon, 2001; Lubienski, 2003; Tolbert & Zucker, 1983; Shipan and Volden, 2005), public pressure, and vertical influence from higher levels of authority, and so forth (Berry & Berry, 1990; 1999; 2007; 2008; Walker, 2006; Walker, Avellaneda, & Berry, 2007).[1] Such different factors drive different types of policy diffusion (Walker, 2006: 330). In addition, policy diffusion or adoption is sometimes a costly and risky endeavor, not just financially, but in political terms as well (Brooks, 2007: 705). Thus, policy diffusion is complex and contingent in many cases (Walker, 2006: 311) so that policy diffusion students strive to combine various theories to address the topic systematically.

Ryan & Gross (1943) and Walker (1969: 897-898) stress that networks between organizations or between individuals are important factors in the process of diffusion. Some studies of policy diffusion also emphasize that policy networks can play pivotal roles in policy diffusion and a network approach can systematically analyze policy diffusion (Mintrom & Vergari, 1998; Abrahamson & Rosenkopf, 1997; Rogers, 2003). There are many studies that investigate the mechanisms of policy diffusion (Shipan & Volden, 2008; Brooks, 2007; Gray, 1973, Mintrom & Vergari, 1998). For example, communication theorists have verified that the cumulative number of adopters is an S-shaped curve and an individual is more likely to adopt an innovation if others in personal networks have previously adopted (Rogers, 2003; Rogers & Kincaid, 1981; Valente, 1995).

In addition, numerous studies on network externalities generally have solely been conducted on system or technology diffusion of the private sector from the early 1980s, focus on only direct network externalities, and consider only positive effects (Reinganum, 1981; 1983; Kata & Shapiro, 1986; Quirmach, 1986; Riggins, Kriebel, & Mukhopadhyay, 1994; Gowrisankaran & Stavins,

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1) Studies on management adoptions and diffusion have primarily been conducted in the private sector using profitability as the key criteria for adoption. Although much literature exists on what makes an organization innovative, these works are rarely focused on adoption, diffusion, and implementation (Berry, 2008: 1)

2004; Mahler & Rogers, 1999).[2] However, network externalities can also occur in indirect modes considering negative effects (Liebowitz & Margolis, 1994).[3] Therefore, this paper considers that network externalities might also occur in policy diffusion process in other modes such as indirect-negative modes. Network externalities can account for dynamic interactions and their processes between jurisdictions, organizations, and individuals. However, political scientists and public administrators have until now overlooked the substantial influence of network externalities on policy diffusion. Therefore, this study strives to theoretically scrutinize how network externalities can influence policy diffusion process.

This study consequently investigates dynamic change and its process of policy diffusion in greater detail by incorporating network externalities. The paper first addresses the attributes of policy diffusion and network modes of policy diffusion that are categorized in a detailed continuum of diffusion modes from vertical diffusion to intersecting diffusion to horizontal diffusion and then incorporates network externalities into policy diffusion process. The next section builds a policy diffusion process model to investigate the impact of network externalities on policy diffusion, focusing on policy adoption.[4] Based

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2) Studies of network externalities in the private sector are conducted in a variety of areas.

3) Even though these arguments implicitly suggest that networks can raise network externalities in policy diffusion, this does not reasonably account for the influence of network externalities on policy diffusion in detail.

4) Many previous studies on network externalities have also focused on economic effects and performance because the studies have been done in the fields of economics and business administration. While some studies focus on inefficiencies in product performance and seek to find solutions based on competition (Yang, 1997; Thum, 1993), other studies emphasize that network externalities can lead to higher market returns rather than to quality itself (Molina-Castillo, Munuera-Alemaan, and Calantone, 2011). In addition, network externalities can cause price increases and promote the speed of market growth (Bayer and Chan, 204; Economides and Himmelberg, 1994). In the same sense, even though this study focuses on the influence of network externalities on policy adoption, network externalities also can have a substantial impact on policy implementation and performance in the policy diffusion process. Positive network externalities promote innovation and heighten

on this mechanism and the attributes of policy diffusion, this study suggests research agendas to investigate the influence of network externalities on policy diffusion for future studies. Lastly, this paper concludes with a theoretical discussion.

Policy Diffusion and Network Externalities

The Attributes of Policy Diffusion

Rogers (1983: 5) defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system." Diffusion models are interactions in social systems concerned with the spread of information (Rogers, 2003). Many studies view policy

policy performance, as well as decrease implementation costs. However, negative network externalities may create inefficiency in the dynamic process of adoption and eventually will inhibit innovation (Farrell and Saoloner, 1986; Yang, 1997). In addition, negative network externalities will also increase implementation costs and result in inefficient consequences. Some studies of policy networks in Korea also explore network effects in policy diffusion including adoption and implementation. Kim and Ahn (2003) verify the effects of networks on policy decision makers' perception of super-high speed information and communications network policy. Kim and Kim (2004) also emphasize that members' perception within the policy network of the Automated Traffic Enforcement Systems of private businesses promotes diffusion of the unmanned camera system. Taeyoung Kim (2008) also posits that policy networks substantially influence the legislation process for the comprehensive real estate holding tax, and in his study, Oakil Kim (2008) emphasizes that policy networks promote the national education information system. However, the commonality of these studies is that even though they explain network effects due to network externalities, the studies do not appropriately apply network externalities to policy decision making processes focused on diffusion, change, or performance. We believe that if the authors had applied network externalities to their studies, they might more clearly and reasonably explain their research. The introduction of network externalities to the study of policy diffusion is a critical contribution in that it can fill such a limitation and lacuna.

diffusion as emulations and learning processes of previous adoptions by other jurisdictions (Meseguer, 2005: 72; Berry, 2008: 2)[5], and note that policy diffusion arises in several forms.

This paper emphasizes that policy diffusion is a type of network process (Mintrom & Vergari, 1998: 126). In general, existing research suggests policy diffusion occurs when benefits are incremental and the costs of the new policy or service decrease over time (Quirmbach, 1986: 34). However, the policy diffusion results from interaction between individuals or organizations. Policy diffusion does not function like a machine, but sometimes functions with increasing or decreasing returns due to the change of marginal costs and benefits that result from transaction costs and scales of economy or diseconomy (Graham, Volden, & Shipan, 2008: 26). Therefore, some scholars have tried to introduce path dependency to explain policy diffusion (Abrahamson & Rosenkopf, 1997; Pierson, 2000; Berry, 2008).[6] Extant policy studies of path dependency usually concentrate on increasing return mechanisms because the concept of path dependency can be well captured by the idea of increasing returns (Pierson, 2000: 252; Thelen, 1999; Abrahamson & Rosenkopf, 1997). However, decision makers might face decreasing returns because of the high transaction costs that a policy causes (Brooks, 2007; Berry, 2008; Conway, 1911). Therefore, this study also distinguishes decreasing returns in policy diffusion (Kay, 2005: 563).

The key is that positive network externalities tend to take place in those policies that involve increasing returns in policy diffusion and negative network externalities are likely to arise in the policies that involve decreasing

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5) Berry & Berry (1999; 2007; 2008) note that government jurisdictions learn from or copy each other through learning, competition, public pressure, and vertical influence from oversight governments or bodies, and describe in depth four models of diffusion: national interaction model, regional diffusion or geographic proximity, isomorphism, and leader-laggard.

6) A primary logic of the path dependency is that potential policy adopters can decide to adopt based on a simple cost-benefit analysis(Abrahamson & Rosenkopf, 1997: 292) and early choices set the framework and incentives for later choices (Berry, 2008: 3; Pierson, 2000: 252).

returns. Yet, this does not necessarily denote a causal relationship. Positive network externalities can occur in policy diffusion that includes decreasing returns, or negative network externalities can arise in policy diffusion that involves increasing returns.[7] However, increasing returns in policy diffusion mean that the marginal benefits in a policy become greater than the policy's marginal costs over time so that the rate of policy adoption in jurisdictions increases more and more. Thus, network externalities usually occur in increasing returns of a policy because if marginal benefits become more than marginal costs in a policy, potential adopters are likely to value the policy more highly. Hence, they tend to adopt the policy more. On the other hand, the diffusion process of some policies may be characterized by disagreement on objectives and can result in disparities. Some existing institutions might often reinforce such disparities so that citizens can eventually be disadvantaged by the prevailing institutions. These problems raise high negotiation costs that may yield less and less output even though policy diffusion occurs.

Although there is common agreement that increasing returns often promotes policy diffusion, policy diffusion can also occur in the process of decreasing returns where marginal costs in a policy become greater than marginal benefits over time. However, in this case, the rate of policy adoption decreases more and more over time (Graham, Volden, & Shipan, 2008: 26; Thelen, 1999: 385-386). Political power, incorrect information, or speech manipulation can raise positive network externalities even in a policy that shows decreasing returns, and may be eventually adopted. Although, if marginal benefits continue to become less than marginal costs in a policy, potential adopters are likely to value the policy less and are less likely to adopt the policy. Therefore, network externalities also can arise in the decreasing returns of a policy.

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7) The policy decision making process generally is subject to a positive feedback process and this process can describe increasing returns processes (Pierson, 2000: 252).

Network Types in Policy Diffusion

Many studies concerned with policy diffusion suggest modes of learning, competition, coercion (or public pressure and vertical influence), socialization, and so forth (Berry & Berry, 1992; Walker, Avellaneda, & Berry, 2007; Graham, Volden, & Shipan, 2008). However, these typologies may not fully address the impact of network externalities on policy diffusion with consistent criteria, nor can they explain policy diffusion resulting from conflicts. The diffusion modes mentioned above are also likely to overlap. For example, learning exists in most diffusion modes. Thus, this paper builds a new typology in order to systematically investigate network externalities in policy diffusion with consistent indicators.

This paper supposes that network types of policy diffusion are a continuum from pure vertical networks to pure horizontal networks. Horizontal diffusion means policy diffusion across the relationship of governments or organizations at the same level. Thus, horizontal policy diffusion is likely to include interest groups of many types, citizens, elected officials and managers, as well as business interests and other major financial institutions and employers. In addition, active interaction between jurisdictions promotes policy diffusion because governments have incentives to introduce successful policies from neighborhood authorities geographically or functionally through cooperation or information exchange. However, if benefits of the policies are a zero-sum game, high negotiation costs can occur in the process of policy diffusion because actors will compete or conflict to maximize their own goal functions. Therefore, this study also considers three types of horizontal policy diffusion: cooperation, competition, and conflict.

In contrast to this horizontal diffusion, vertical diffusion can occur. Vertical diffusion means a hierarchical diffusion structure through bottom-up mode and/or top-down mode (Shipan & Volden, 2008). Many policies require close connection or consistency between higher-level and lower-level agencies, and higher-level governments can intervene in or control policies of lower-level governments. Therefore, policy diffusion can occur as a top-down mode. The

power of vertical networks helps diffuse some high valence issues, such as gay marriage laws or tax limitations that would not have been embraced at the local or state level without the influence and mobilization of interests from higher levels of a vertical network. On the other hand, some policies can diffuse because of public pressure that claims to resolve social problems. In particular, interest groups closely connect with politicians or public officials and lobby or pressure to reflect the group's interests in public policies. The interest groups' strategic efforts are usually salient in the adoption of new policies or in the process of policy revision (Shipan & Volden, 2005; 2008).

However, in reality, many networks in policy diffusion are likely to show bundles of vertical networks and horizontal networks. Thus, it might not make sense to distinguish networks in policy diffusion dichotomously as pure vertical networks and horizontal networks. The mode of bundled vertical networks and horizontal networks is complicated and cannot be defined easily because the mode includes varied and mingled attributes. For example, the local chamber of commerce exists within a vertical network that includes the state and national chamber of commerce organizations, from which the local group receives resources and policy directions. Yet the local chamber of commerce also exists within a horizontal network that includes other local chambers of commerce. These types of intersecting networks are similar to what Deil Wright (1988) called picket fence federalism, whereby the local or state horizontal network is always intersected by vertical programs or single policy networks. Therefore, this study introduces a more or less flexible network typology by concentrating on pure vertical networks and pure horizontal networks and broadly regards the median range as intersecting network modes.[8)]

Network Externalities in Policy Diffusion

Network externalities result from dynamic networks where stakeholders interact. The stakeholders will maximize their own interests by strategically

8) In future empirical studies, the interaction and intersection of horizontal and vertical networks should be studied.

forming networks, considering the benefits and transaction costs of when they adopt the policies. Thus, network externalities can become useful tools for stakeholders to adopt or reject some policies.

Much of the extant literature, particularly in economics, deals with the problems that arise when network externalities exist. In the economics and business literature, network externalities generally are classified into two dimensions: direct network and indirect network externalities (Liebowitz & Margolis, 1995).[9] Network externalities are defined as "a quality of certain goods and services such that they become more valuable to a user as the number of users increases" (Rogers, 2003: 350). Network externalities assume the value of goods or services to a firm or a user increases with the number of other users because the quality and availability of ex post-purchase of goods or services depend on the experience and network size of services and goods. Direct network externalities suggest that an increase in the size of a network increases the number of others with whom one can communicate directly and eventually increases the number of users of a product. Therefore, the more the number of users of the product increases, the more consumers value the product more highly.[10] Indirect network externalities suggest that an increase in the size of a network expands the range of complementary or compatible products available to the members of the network. Therefore, consumers value a product more highly when it is compatible with other products (Liebowitz & Margolis, 1994: 134; 1995: 2; Farrel & Saloner, 1985: 71).[11]

This network externality concept can be applied to policy diffusion because

9) Network refers to the relationship among the nodes, such as persons, groups, organizations, or other entities (Scott & Davis, 2007: 279), and externality can be defined as "any valued impact (positive and negative) resulting from any action (whether related to production or consumption) that affects someone who did not fully consent to it through participation in voluntary exchange" (Weimer & Vining, 2004: 91).

10) For example, software programs are necessary goods for computers, and the more program users, the more the programs increase in value.

11) For example, the Internet expands the range of network of computer security program users and expansion of the network of the computer security program raises the value and utility of the Internet.

policy diffusion also occurs in interdependent networks. Network size and nature in policy diffusion can constrain or promote the effects that the policies produce (Soubeyran, Suzumura, & Weber, 2007: 47). As the network size of some policies increases or the network size of compatible policies increases due to the policies, potential adopters of the policies are likely to value the policies more highly so that potential adopters tend to adopt the policies more. For example, as network size of a subsidy program for local economic development increases, potential adopters tend to value the policies more highly such that they are more likely to adopt the policy. In addition, if the subsidy program encourages a tax policy compatible with it, extension of the subsidy program makes potential adopters value the tax policy more highly so that they tend to adopt the tax policy more.

However, there is no reason that a network externality should necessarily be limited to positive effects. For example, if the internet service becomes overloaded, the effect on an individual subscriber will be negative in terms of its value (Liebowitz & Margolis: 1994: 135). Yet the individual subscriber is not compensated for the delay resulting from the loss of internet services. Thus, negative network externalities can occur. In addition, increase of network size of a product can increase the range of compatible or complementary products available to the members of the networks. However, because the compatible or complementary products generate negative externalities, consumers value the product less and rarely buy the product.[12] In this sense, as the network size of some policies increases or the network size of compatible policies increases due to the policies, potential adopters of the policies are likely to value the policies less so potential adopters rarely adopt the policies. For example, even though network size of some local economic development policies increases, many decision makers and citizens value the policies less due to serious environmental pollution. In addition, as the network size of

12) For instance, as the network size of country clubs increases, the networks of fertilizers and pesticides are used on the golf courses will increase. However, people near the country clubs will value the golf courses less and less due to toxic substances from the chemicals used.

local development policy increases, decision makers or citizens value less the growth management programs that are compatible with the development policy because the programs restrict local economic development.

The Model for the Impact of Network Externalities on Policy Diffusion

Many existing studies address the mechanisms of policy diffusion and empirically test various types of policy diffusion (Rogers, 2003; Shipan & Volden, 2008; Brooks, 2007; Abrahamson & Rosenkopf, 1997; Walker, Avellaneda, & Berry, 2007; Graham, Volden, & Shipan, 2008; Walker, 2006; Berry, 1999; Meseguer, 2005). However, these studies did not appropriately explain the influence of dynamic network externalities in policy diffusion that involve problems and actors' behaviors in the diffusion process. Therefore, this study strives to build a model to systematically explain the influence of network externalities on policy diffusion process, focusing on policy adoption.[13)]

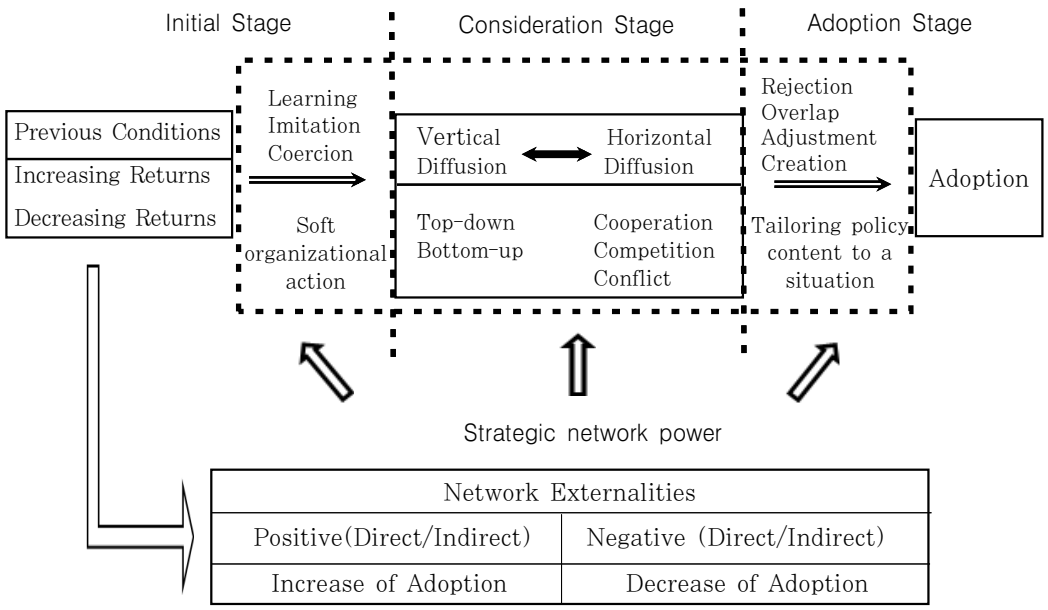
Policy Diffusion Process

Since most stakeholders, including decision makers, face information asymmetry based on bounded rationality, they are likely to be dependent on policy networks to obtain information for policy adoption. Policy diffusion is interactions based on social learning (Brooks, 2007), and social learning entails a change of value and information on a policy (Meseguer, 2005: 67 -72). Accordingly, networks of potential adopters play a pivotal role in restricting or stimulating policy diffusion (Graham, Volden, & Shipan, 2008: 17-19).

13) The study of policy diffusion ranges from agenda setting to performance evaluation. Such a broad spectrum is not easy to cover in a study with page limitations. Therefore, this study focuses only on the range from agenda setting to policy adoption, excluding implementation and performance evaluation.

In addition, uncertainty and risk of unanticipated results has been a high barrier against policy diffusion (Brooks, 2007: 704; Walker, 1969: 890). This paper recognizes that network externalities enable some policies to change their values, information, and perception on uncertainty and risk. This study divides policy diffusion process in order to systematically explain the influence of network externalities on policy diffusion. While previous studies suggests varied policy diffusion mechanisms such as competition, learning, and imitation, or horizontal and vertical diffusion, these studies have rarely integrated these mechanisms with a systematic policy diffusion process. As seen in [figure 1] below, this study categorizes the policy diffusion process into three stages: an Initial Stage, a Consideration Stage, and an Adoption Stage. Even though Grary (1973) strives to explain policy diffusion as an S-shaped curve, the model is not useful when addressing the influence of network externalities on policy diffusion because it focuses on the quantitative increase of policy adoption. This limitation is found in the threshold model of diffusion that Granovetter (1978) uses or on which Oliver and Marwell (1988) focus.

<Figure 1> Policy Diffusion Process



However, Rogers (2003) systematically presents five stages of the policy diffusion process including knowledge, persuasion, decision, implementation, and confirmation stages. In fact, his first three process stages are similar to the three stages built in this study. However, Rogers (2003) does not systematically incorporate policy diffusion mechanisms such as imitation, learning, and coercion or vertical and horizontal modes into the policy diffusion process. Therefore, focusing on policy adoption, this study builds a policy diffusion process model with three stages that integrates policy diffusion mechanisms and diffusion modes that previous studies emphasize in order to systematically explain the dynamic influence of network externalities on policy adoption.

Initial Stage

Policy adopters usually decide whether or not they will adopt some policies by considering increasing returns or decreasing returns of the policies. Generally, policy diffusion comes from existing policies that show increasing returns. This study designates this stage the Initial Stage. When external pressure or internal agreement exists (Valente, 1995), policy adopters strive to get information about the policies in question. Opinion leaders can drive the pressure and agreement through dynamic activities (Rogers, 2003; Valente, 1995). Thus, this model starts from existing policies that show increasing returns. Increasing returns are a sign of potential success for some policies and so provide positive signals for policy adoption. Therefore, potential policy adopters seek to obtain information about policies that show increasing returns. While information from voluntary agreement and choice is usually dependent on learning or imitation, information from internal/external pressure is usually coercive (Walker et al., 2007).

Even though policy adopters strive to first get information about some policies, policy diffusion is likely to begin from soft organizational actions that acquire information by learning, imitation, or coercion (Berry & Berry, 1999). Thus, information costs or research costs usually arise in the initial stage.

Therefore, the initial stage can be considered as the stage to obtain information about increasing returns and decreasing returns of some policies through soft organizational action. A policy that generates increasing returns usually is transferred to potential adopters by learning or imitation. However, a policy that raises decreasing returns rarely is transferred to potential adopters (Pierson, 2000). If the policy is transferred to a potential adopter, it might be coercive.

Since potential policy adopters face information asymmetry, they strive to get information about policies. Even if decision makers or interest groups evaluate the characteristics as well as advantages and disadvantages of existing policies, these stakeholders simultaneously consider outcomes or preference of the policies in other jurisdictions or organizations. Increasing returns of a policy usually raise positive network externalities with positive signals, and so make potential adopters overestimate the policy. Therefore, increasing returns in other jurisdictions may provide the potential adopters with incentives to perceive the policies advantageously and policy adopters are likely to value the policy more highly. Therefore, policy adopters seek to more actively obtain information about the policy by learning or through imitation (Meseguer, 2005; Shipan & Volden, 2008).

However, decreasing returns usually raise negative network externalities with negative signals, and thus cause potential adopters to underestimate a policy. Decreasing returns in other jurisdictions may provide policy adopters with incentives to perceive the policies disadvantageously and tend to value the policy less (Kay, 2005). Thus, policy adopters are likely not to obtain information about the policy or to search for information in passive or coercive ways. That is, network externalities in the initial stage substantially influence the preferences and attitudes for the information search of potential adopters.

However, cases where policies have shown increasing returns increase negative network externalities or cases where policies have shown decreasing returns that cause positive network externalities do not usually occur in modern democratic countries that have high information technology and infrastructure because poorly conceived policies are quickly identified and

discredited (Mintrom & Vergari, 1998: 128). If poorly conceived policies occur, during the initial stage there might be political bargaining and tradeoff between actors, and political power or speech manipulation might be exercised to strategically increase network externalities. For example, politicians with high-power incentives will try to maximize voters' support and political funds. Strongly organized interest groups will also exercise political power through political funding and voting power in order to reflect their preferences and interests in policy decisions (Clingermayer & Feiock, 2001; Frant, 1996). Therefore, policy diffusion in these modes involves tradeoffs or political bargaining. However, this is an uncommon case as mentioned above, and may terminate in the process of agenda setting due to high objection and uncertainty.

In addition, a policy that shows decreasing returns will naturally raise negative network externalities (Liebowitz & Margolis, 1994). Negative network externalities in a policy that has shown decreasing returns can substantially influence delaying or rejecting policy adoption. Policy diffusion in this condition cannot realistically be found in civil society based on democratic political institutions. Nevertheless, this mode might exist in an authoritarian country or during international policy diffusion. We can see that some countries or authoritarians coercively require adoption of advantageous policies to pursue their own interests through political and military power. In general, authoritarian governments adopt policy in order to achieve self-interested objectives, such as political power maintenance or personal interests. Thus, core decision makers get information only through coercion. In addition, some interest groups might get information through learning or imitation for their self-interested goals. However, this is not a common case. Accordingly, policy diffusion will happen in cases where increasing returns usually raise positive network externalities.

Consideration Stage

This stage suggests that potential adopters actively and strategically behave

to achieve their goals based on information and knowledge that they obtain in the initial stage. This study regards this stage as the Consideration Stage. In the consideration stage, policy diffusion can be either horizontal and vertical diffusion or intersecting diffusion. As seen below [Figure 1], vertical diffusion can occur in top-down or bottom-up modes and horizontal diffusion can occur through types of cooperation, competition, or conflict (Shipan & Volden, 2005; Mintrom & Vergari, 1998). It is not easy to obviously define intersecting diffusion intermixed with vertical and horizontal modes. Thus, this paper does not exclusively classify policy diffusion into vertical diffusion and horizontal diffusion. Instead, this study focuses on pure vertical and horizontal diffusion while considering intersecting modes with various characteristics that will be at points between the two extreme diffusion modes.

These diffusion modes can be encouraged or constrained by network externalities as well as result in varied collective action problems (Rogers, 2003). Interest groups or politicians who have high-power incentives intentionally or strategically might manipulate policies for their own interests. If strongly organized interest groups or powerful politicians want to intervene in adoption of a policy that shows increasing returns, the interest groups or politicians can exercise strategic network power that can play pivotal roles in maximizing their own interests (Valente, 1999: 10-11). Strategic network power substantially influences bargaining in collective actions between stakeholders. These interest groups can lobby for particular interests and cause social waste through manipulating network externalities. Therefore, various transaction costs such as bargaining costs, monitoring costs, and agency costs can arise during the consideration stage.

While positive network externalities generally justify and promote policy diffusion, negative network externalities usually block or delay policy diffusion (Rogers, 2003). The positive network externalities in policy diffusion or adoption might be dependent on actors' strategic network power. If some governments or organizations have weak network power, the governments and organizations might not efficiently generate positive network externalities and delay policy adoption or diffusion, generating high transaction costs.

Specifically, positive network externalities encourage potential adopters to value the policy higher. In addition, as positive network externalities increase, potential adopters can obtain justice and support from citizens more easily (Liebowitz & Margolis, 1994). Accordingly, horizontal diffusion will arise by cooperation among stakeholders and vertical diffusion can happen in both top-down and bottom-up modes, based on voluntary governance. Therefore, the positive network externalities tend to reduce bargaining costs and agency costs.

On the other hand, the positive network externalities might increase negotiation or bargaining costs that occur in competition mode of horizontal diffusion because they will promote competition. Specifically, competition in horizontal diffusion tends to cause strategic rent seeking in inter-jurisdictions and may result in delay of diffusion (Tullock, 2005). Strategic bargaining of the politicians who have high-power incentives and interest groups who are self-interested will be remarkable as positive network externalities increase (Frant, 1996). In addition, as the possibility of adoption increases due to positive network externalities, some interest groups or governments may get a free ride if they can benefit from the policy without investing their resources in policy adoption.

Negative network externalities tend to make potential adopters value a policy less. If higher-level governments or political leaders do not have strong belief in and preference for the policy, potential adopters might not adopt the policy with negative network externalities (Rogers, 2003). Therefore, strong leadership and strategic network power will be determinants for policy diffusion when negative network externalities exist. In situations where negative network externalities are dominant, information will be coercively delivered by core decision makers (Rogers, 2003:239). Thus, policy diffusion resulting from negative network externalities can entail long-term negotiation and resistance from citizens or the country that should adopt the policy and even can extend to conflict. Potential adopters must constrain negative network externalities by manipulation of press or public opinion through strategic network power and strong leadership. Therefore, diffusion of policy

with negative network externalities will entirely result from the authoritarian government that wants to achieve self-interested objectives such as political power maintenance or personal interests. Thus, policy diffusion in this condition is likely to be coercive and top-down mode.

In addition, conflicts between the authorities and citizens can occur in countries with authoritarian political power. If the authoritarian government has strong power and constraints, conflicts will not frequently occur because citizens and/or interest groups cannot resist (Rogers, 2003). In this case, transaction costs for policy adoption will be low. However, as citizenship and public opinion become activated, citizens' resistance will increase and can generate high transaction costs due to conflict between government and citizens.

In addition, if a policy can generate high potential losses of strongly organized interest groups in even a democratic society, the interest groups might spread negative network externalities through strategic network power. In addition, if a new policy is not compatible with existing policies, potential adopters might try to decline adoption of the policy because adoption of the new policy can require high switching costs (Dowd & Greenaway, 1993). Therefore, the negative network externalities are likely to increase negotiation costs, monitoring costs, and agency costs in the top-down or bottom-up mode of vertical diffusion, and in the cooperation and conflict of horizontal diffusion. However, negative network externalities will reduce negotiation and bargaining costs in competition in horizontal diffusion because potential adopters value a policy less due to the negative network externalities and mitigate the competition between potential adopters. Moreover, since negative network externalities can give rise to citizens' or interest groups' political pressure through making negative public opinion on a policy, decision makers' strong beliefs and public opinion can conflict with each other (Rogers, 2003). Such conflict can eventually result in high transaction costs.

Adoption Stage

After considering most conditions, potential adopters decide whether or not to adopt the policy. Positive network externalities usually promote policy adoption and diffusion by making potential adopters value the policy more highly (Valente, 1999; Lee et al., 2003; Katz & Shapiro, 1992). Yet, if negative network externalities are dominant, the policy might be rejected. However, if policy-makers decided to adopt the policy, policy diffusion will entail the process of tailoring the policy contents to the local policy situation (Gray, 1973; Mintrom, 1997). This study categorizes this stage as the Adoption Stage. In the adoption stage, a policy is adjusted in a government or organization through the arrangement process. This process might be modification of the policy; overlap with existing policies due to competition between agencies; or creation of new policy.

This study recognizes that in the adoption stage, tailoring policy contents also can be influenced by network externalities (Rogers, 2003: 424-435). Even though adopted policies are generally tailored to local situations through adjustment or changes in existing policies, the adopters that want to maximize budgets or the size of organizations may have incentives to craft overlapping policies with other organizations or governments because the positive network externalities can lead adopters to overestimate the policy. Moreover, positive network externalities can promote creation of new policies in order to complement the limitations of the policy or expand the policy (Graham et al., 2008). Accordingly, high switching costs or implementation costs can occur during this stage.

In addition, policies that give rise to negative network externalities may be continually blocked by interest groups or citizens' objections and pressure. However, if the policy would provide strongly organized interest groups with high benefits and at the same time would inflict high losses on other interest groups or citizens, long-term pressures or resistance can occur. Thus, high negotiation costs and social waste due to multiple conflicts can occur in the adoption stage.

Research Agenda of Network Externalities in Policy Diffusion

Based on the policy diffusion process addressed in previous sections, this study suggests future research agendas to investigate the influence of network externalities on policy diffusion. The suggested research agendas will first be based on the nature of network externalities, and second, build sequentially from the influence of network externalities in each of the three stages herein discussed: the initial stage, the consideration stage, and the adoption stage. Since this study focuses on the stages at in the pre-implementation phase, the study suggests research agendas by providing hypotheses for future studies. Network externality has been popular in economics, business administration, sociology, and communication, and has been verified by different empirical studies. However, it has not been empirically verified in public administration and policy studies and lacks theoretical discussion in this arena. Therefore, theoretical discussion of the influence of network externalities on policy diffusion and the agendas suggested below are dependent on interdisciplinary study which simultaneously considers a variety of previous studies that investigate network externalities and policy diffusion.

The Natures of Network Externalities

Perception and Network Externalities. The perception of potential adopters and network externalities has a close causal relationship with policy diffusion. However, previous studies have not empirically studied the relationship between perception and network externalities in policy diffusion. Therefore, this study suggests a related hypothesis.

While positive network externalities make potential adopters value a policy more highly, negative network externalities make them value a policy less (Katz & Shapiro, 1986; 1992). Therefore, positive network externalities tend

to cause overestimation of a policy and negative network externalities are likely to cause underestimation of a policy. For example, when compatibility between policies is high, the policies interact and can produce synergy with one another. Thus, compatibility of policies tends to make policies diffuse more easily over time because policy adopters will consider the policy more positively (Liebowitz & Margolis, 1994; Farrel & Saloner, 1985). Therefore, if an existing policy is compatible with a new policy, the compatibility can give rise to interdependent policy conditions (Kristiansen, 1998: 532). Accordingly, compatible policies can increase positive network externalities.

On the other hand, if an existing policy and a new policy are compatible and the existing policy is not useful, this problem might generate negative network externalities for the new policy and may delay or block adoption of the new policy. In addition, generally, as the rate of policy adoption increases, the increase gives rise to positive network externalities so that the positive network externalities provide policy adopters with incentives to increase the reputation or value of some policies (Valente, 1999). Contrarily, as the rate of a policy adoption decreases, the decrease generates negative network externalities. From this perspective, this study suggests the research agenda below.

H1: While positive perception of a policy is more likely to promote positive network externalities, negative perception is more likely to encourage negative network externalities.

Information Accessibility and Network Externalities. Network externalities and information also can have a close relationship. However, previous studies have not studied the relationship between information accessibility and network externalities even though the relationship can have a substantial impact on policy diffusion.

Geographically, governments or organizations within a local or state boundary can be highly accessible to each other. Most governments usually pay attention to policies that are accessible more easily. Governments or organizations can take notice of the processes and results of each other's policy

adoption more easily. Therefore, information accessibility will heighten the frequency of interaction and stimulate sharing of information (Mahler & Rogers, 1999). Local governments within geographically neighboring jurisdictions or within jurisdictions that have internally similar conditions are more likely to increase network externalities (DiMaggio & Powell, 1983). Therefore, network externalities in general tend to occur more between neighboring jurisdictions. Potential adopters can more easily know information that neighboring and functionally similar communities have yielded.[14] From this perspective, this study suggests the following research agenda:

H2: High information accessibility within the same geographical boundary is more likely to enhance both positive and negative network externalities.

The Stages of Policy Diffusion

Initial Stage: Soft Organizing Actions and Network Externalities. Governments or organizations in the initial stage of policy diffusion are likely to seek information on policies that they prefer to adopt through soft organizing actions such as learning, imitation, and coercion. These soft organizing actions can substantially influence information costs and raise collective action problems. Therefore, it is important to empirically explore the relationship between soft organizing actions and network externalities.

In general, while increasing returns are likely to raise positive externalities, decreasing returns are likely to generate negative externalities. Therefore, if the policies that have showed increasing returns generate positive network externalities, potential adopters will strive to get information concerned with the policy by learning or through imitation (Meseguer, 2005). However, if the policies that have showed increasing returns generate negative network externalities or if a policy that has showed decreasing returns generates

14) Ironically, however, network externalities can be greater as information asymmetry becomes bigger because information asymmetry leads to more overestimation or underestimation. Thus, adopters may experience policy failure more easily due to high information asymmetry.

positive network externalities, coercion is likely to be the main way of getting information for diffusion of a certain policy. These mismatches between increasing/decreasing returns and network externalities are usually due to intentional goals of policy decision makers or strong interest groups. Therefore, institutional collective action dilemmas such as free riding can occur during this stage (Feiock & Scholz, 2010; Ostrom, 2005).

In addition, policies that have shown decreasing returns naturally cause negative network externalities. Accordingly, the policies do not generally have incentives to diffuse toward other jurisdictions. However, if the policy diffuses to other jurisdictions by intentionally or enforcedly raising positive network externalities, the policy diffusion is also likely to be based on intentional goals of self-interested decision makers and interest groups. Therefore, information in this mechanism also will be likely to be obtained through coercion. In this sense, this study suggests the following research agendas:

H3: Self-organizing actions of increasing returns that raise positive network externalities are more likely to be learning or imitating.

H4: Self-organizing actions at the mismatch between increasing/decreasing returns and network externalities are more likely to be coercive.

Consideration Stage: Policy Diffusion Modes and Network Externalities. Network externalities in policy diffusion can significantly influence both vertical and horizontal diffusions. Whereas positive network externalities usually provide potential adopters with strong incentives to adopt the policy, negative network externalities generally supply them with strong incentives to block adoption of the policy. Therefore, core decision makers or citizens are more likely to prefer to adopt policies with positive network externalities. The vertical diffusion of policies with positive network externalities can occur through both top-down and bottom-up modes, and potential adopters can adopt the policies more easily because transaction costs for diffusion will be low (Shipan & Volden, 2005; 2008). However, if there is vertical diffusion of a policy that generates negative network externalities, this diffusion will happen in only top-down mode because it is more or less coercive. In addition,

transaction costs for diffusion will be higher because of objectors to the policy adoption.

In addition, positive network externalities tend to promote horizontal diffusion of policies more through cooperation. However, positive network externalities can give rise to rent seeking of stakeholders with different interests and will raise policy diffusion through competition (Berry & Berry, 1999; Mintrom & Vergari, 1998). On the other hand, policy diffusion due to negative network externalities in horizontal diffusion might not happen easily because of objectors. However, if the diffusion occurs in negative network externalities, it is more likely to happen through conflict. Accordingly, conflict between supporters and objectors might be inevitable. If horizontal policy diffusion occurs in a situation where negative externalities exist, such diffusion is more likely to coercively arise as a result of political influence of strongly organized interest groups or political organizations. From this perspective, this study suggests the following research agendas:

H5: While vertical policy diffusion due to positive network externalities is likely to be top-down or bottom-up mode, vertical policy diffusion due to negative network externalities is likely to be only top-down mode.

H6: While horizontal policy diffusion due to positive network externalities is likely occur through cooperative or competitive modes, horizontal policy diffusion due to negative network externalities is likely to occur only through conflict mode.

Consideration Stage: Strategic Network Power and Network Externalities. Strategic network power can play a key role in promoting or constraining network externalities. Strongly organized interest groups with sufficient resources often take advantage of their strategic network power to influence decision makers, exercising voting and financial power. They try to transfer their intentions to public opinion, strategically spreading over positive network externalities. Therefore, governments or organizations with more resources might be in a better position to adopt new policies than governments or

organizations with fewer resources because large governments might have greater administrative and political resources to take advantage of strategic network powers (Moon and deLeon, 2001: 341-342). Policy entrepreneurs can also actively stimulate positive network externalities or restrict negative network externalities because they can exercise network power. Entrepreneurs with more political influence and resources will play more pivotal roles in generating network externalities for policy diffusion or adoption (Mintrom, 1997). Therefore, strategic network power can be a determinant controlling and arranging network externalities.

In addition, strategic network power shows different dynamicity between vertical diffusion and horizontal diffusion. Strategic network power in vertical diffusion is likely to be obvious and unilateral because dominant governments or interest groups usually drive policy adoption. On the other hand, horizontal diffusion can involve repeated network power games, and structures of the network power can dynamically change because interest groups or governments seek to acquire dominant network power among each other in order to maximize their own interests by various collective actions such as cooperation, competition, and conflict (Shipan & Volden, 2008). Therefore, strategic network power in horizontal diffusion can be more dynamic than in vertical diffusion. Thus, this study suggests the following research agendas:

H7: Actors with more resources are likely to exercise more strategic network power in generating network externalities for policy diffusion.

H8: Strategic network power in horizontal diffusion is likely to be more dynamic than strategic network power in vertical diffusion.

Adoption Stage: Policy Adoption and Network Externalities. Organizations inherently seek to maximize their own interests (Niakanen, 1971; Epstein and O'Halloran, 2008).[15] While organizations are likely to prefer a policy that generates positive network externalities, organizations tend to reject a policy

15) Most organizations try to maximize their discretionary budget (Niskanen, 1971) and try to hold powerful authority and controls (Epstein and O'Halloran, 2008).

that generates negative network externalities. Positive network externalities generally contribute to reducing negotiation costs or time costs in the policy adoption process and promote policy diffusion by making potential adopters recognize the policy as beneficial. Therefore, the positive network externalities can reduce bargaining and negotiation costs that may occur in policy diffusion processes (Kristiansen, 1998: 532). Accordingly, positive network externalities will promote policy adoption. On the other hand, negative network externalities usually give rise to high transaction costs in policy adoption because the policy adoption has to pass bargaining or negotiation processes that terminate negative network externalities. Negative network externalities may result in rejection of or large adjustments in policies because stakeholders will try to adjust or reject adopting the policy (Rogers, 2003: 178). Therefore, this study provides the following research agenda:

H9: Whereas positive network externalities are more likely to promote policy adoption and increase adoption rates, negative network externalities are more likely to delay policy adoption and reduce adoption rates.

Discussion and Conclusion

Policy Diffusion Process

This study divides policy diffusion processes into three stages: the initial stage, the consideration stage, and finally the adoption stage. Network externalities can affect soft organizational action in the initial stage, and can affect the consideration stage, raising several collective action problems that entail several transaction costs. The study emphasizes that strategic network power can substantially impact the network externalities in vertical and horizontal diffusion (Rogers, 2003). Lastly, network externalities also can influence the adoption stage. The adoption stage is the processes tailoring policy content to local situations. Therefore, high transaction costs such as

switching costs or negotiation costs can happen in the adoption stage.

For the Initial Stage, the relationship between positive/negative network externalities and increasing/decreasing returns determine various characteristics of policy diffusion. If a policy that has shown increasing returns generates positive network externalities, most stakeholders are more likely to be positive about adopting the policy (Katz & Shapiro, 1986; 1994; Rogers, 2003). Therefore, potential adopters can adopt the policy more easily and transaction costs also will be low. However, if a policy that shows decreasing returns or a policy that generates negative network externalities diffuses to others, potential adopters must negotiate and resolve conflict among stakeholders. Accordingly, transaction costs usually will be high so policy adoption will not be easy.

For the Consideration Stage, diffusion modes present distinctive differences depending on positive and negative externalities. For vertical diffusion, top-down or bottom-up and bundling of both are general modes of positive network externalities and only top-down is the general mode of negative network externalities (Shipan & Volden, 2008). For horizontal diffusion, cooperation or competition is a general mode of positive network externalities and conflict is a general mode of negative network externalities (Berry & Berry, 1999). The Consideration Stage focuses on strategic network power that can encourage or constrain network externalities and that can influence collective action problems and bargaining between stakeholders. Stakeholders with different interests will try to control network externalities to maximize their own interests through policy adoption.

High transaction costs can arise in this process depending on strategies to organize and manage network externalities. Potential adopters will try to obtain support and justice for policy adoption through enhancing positive network externalities. Therefore, as positive network externalities increase on a policy, both policy decision makers and citizens will have positive thinking about the policy (Rogers, 2003). Accordingly, for vertical diffusion, policy diffusion or adoption can happen in both top-down and bottom-up modes with low transaction costs. In addition, for horizontal diffusion or adoption, positive

network externalities will promote a cooperative mode among stakeholders by increasing the willingness of voluntary participation. Then again, positive network externalities can generate over-competition in horizontal diffusion. Strategic network power can play a pivotal role in forming power relationships among stakeholders with different interests.

However, negative network externalities will show different diffusion modes from positive network externalities. Because negative network externalities discourage the willingness or preference for policy diffusion, strong leadership and strategic network power can play a vital role in diffusing a policy to others if policy diffusion arises in the negative network externalities. Therefore, vertical policy diffusion of policies with negative network externalities is likely to occur as just top-down mode, rather than bottom-up mode. In addition, horizontal policy diffusion of policies with negative network externalities is more likely to occur by conflict mode because stakeholders have different interests, and objectors and supports can conflict with each other.

Network externalities can also substantially influence the adoption stage. The adoption stage includes the process of tailoring policy contents to community conditions. The process is for stakeholders to adjust a policy in order to fit it in a government or an organization. Therefore, stakeholders will try to constrain or encourage network externalities to maximize their own interests. Stakeholders will make an effort to raise positive network externalities when they want to create new policies compatible with existing policies or adopt a policy overlapping with existing policies (Rogers, 2003: 240-249). On the other hand, when stakeholders want to reject adoption of a policy or adjust a policy, they will try to generate negative network externalities. Since negative network externalities raise transaction costs such as negotiation costs and time costs in policy adoption (Liebowitz & Margolis, 1995), stakeholders can take advantage of negative network externalities to pursue their own goals.

Research Agendas

This study also suggests several research agendas for future empirical or case studies. First, it notes the relationship between network externalities and perception and the influence of transaction costs arising in diffusion processes. High transaction costs will cause delay or rejection of policy diffusion. The importance here is that network externalities can increase or reduce transaction costs. A key determinant of network externalities is information accessibility (Rogers, 2003). While beneficial and useful information increases positive network externalities, injurious information will promote negative network externalities. The relationship between information and network externalities needs to be explored with empirical studies.

In addition, some studies strive to integrate policy diffusion with increasing returns or decreasing returns of policies. However, the previous studies did not systematically incorporate the effects of increasing/decreasing returns into policy diffusion. The initial stage explains that types of network externalities and how to obtain information for policy diffusion can be different depending on the relationship between network externalities and increasing/decreasing returns. Increasing returns are more likely to generate positive network externalities and the means for information inflow generally are learning or imitation (Berry & Berry, 1999; Mintrom & Vergari, 1998). However, decreasing returns are more likely to generate negative network externalities.

In addition, decreasing returns might generate positive network externalities and increasing returns might raise negative externalities. Information inflow of policies that generate decreasing returns and raise these mismatches between network externalities and increasing/decreasing returns in general is likely to come true because of strong leaders' coercion. These issues also need to be systematically researched by multiple future empirical studies.

The Consideration Stage includes various policy diffusion modes. Because several stakeholders can encourage or constrain network externalities to maximize their own interests through strategic network power, this stage shows dynamic policy diffusion mechanisms from vertical diffusion modes to

horizontal diffusion modes. Vertical policy diffusion with positive network externalities is likely to be both top-down and bottom-up modes because potential adopters and stakeholders have positive recognition as to the policy (Shipan & Volden, 2008). On the other hand, vertical policy diffusion with negative network externalities tends to be just top-down mode because strong political leaders coercively implement adoption of the policy in the condition where objectors and supporters are likely to conflict with each other. Strategic network power will play a vital role in such policy diffusion processes. In addition, horizontal policy diffusion with positive network externalities is likely to demonstrate cooperative modes because stakeholders agree with policy adoption due to positive network externalities.

However, positive network externalities can give rise to overestimation of a policy and promote rent seeking and competition among stakeholders. On the other hand, negative network externalities will generally delay or reject policy diffusion (Rogers, 2003: 177-179). Then again, if policy diffusion occurs in policies with negative network externalities, the diffusion might arise only through conflict mode because objectors and supporters can conflict in the policy adoption process. It is important to know the relationship between such policy diffusion modes and network externalities because such information can provide policy decision makers with a variety of coping strategies to minimize transaction costs and collective action problems and to successfully achieve their goals. Therefore, policy diffusion students need to systematically study the relationship between diffusion modes and network externalities.

In addition, the influence of strategic network power should not be overlooked in the policy diffusion. Strategic network power can play a pivotal role in encouraging or constraining network externalities, and thus promote or delay policy diffusion by increasing or reducing transaction costs. However, previous studies did not recognize or consider the influence of strategic network power on network externalities. In general, actors with more political power or other resources can exercise strategic network power more strongly. On the other hand, the strategic network power of vertical diffusion might show more dynamicity than the strategic network power of horizontal diffusion.

While horizontal diffusion is likely to include more stakeholders because it can occur through a variety of diffusion modes such as competition, cooperation, and conflict, vertical diffusion is likely to involve fewer stakeholders composed of strong leaders or strongly organized interest groups through top-down or bottom-up mode (Shipan & Volden, 2008). The relationships between diffusion modes and network externalities can substantially influence transaction costs and collective action problems among stakeholders. Accordingly, future studies need to explore the relationships more systematically and in greater detail.

Lastly, this paper emphasizes that network externalities play a role as determinants in the policy adoption stage. The Adoption Step tailors policy contents to local situations. Policy adopters can adjust existing policies or reject adoption of new policies. The policy adopters also might create policies overlapping from existing policies if they believe that the policies can produce a lot of their own benefits. Since positive or negative network externalities can play substantial roles in minimizing or maximizing transaction costs respectively, the policy adopters will heighten or delay the rate of policy adoption. Therefore, it is important to explore the influence of network externalities on the relationships between the extent of policy adoption and transaction costs.

The Contributions

The contribution of this paper is first of all to theoretically explore dynamicity in the process of policy diffusion by integrating network externalities to which previous studies have not paid attention. Policy diffusion can be considered the result of interactions through various types of networks (Ryan and Gross, 1943). Thus, a network approach, in particular network externalities, can be useful to explain dynamicity in the processes of policy diffusion. However, public administration is not familiar with network externalities. Therefore, the introduction of network externalities to the study of policy diffusion is a critical contribution in that it can fill such a limitation and lacuna. Accordingly, critical contribution of this study is that it provides

theoretical foundations and a research model to more systematically and reasonably assess and address the dynamicity of policy diffusion related to network externalities that existing studies have overlooked.

This study integrates network externalities in order to advance policy adoption mechanisms. The study categorizes policy diffusion into vertical diffusion and horizontal diffusion on a continuum (Mintrom & Vergari, 1998; Shipan & Volden, 2008). This typology has advantages that can include various diffusion modes, based on consistent indicators, and is useful to explain policy diffusions at the local, state, national, and international level. Basically, network externalities in economics are usually categorized into direct and indirect network externalities (Katz & Shapiro, 1986; 1992; 1994). However, network externalities in public policy need to be discussed in terms of positive and negative network externalities because public policy should eventually focus on beneficiaries and losers.

This study attempted to explain the dynamicity of policy diffusion due to network externalities with transaction costs approach. Transaction costs can be determinants in policy adoption because the adoption in general entails high information costs, negotiation costs, and switching costs, and so on. Network externalities can have substantial influence on the increase or reduction of these transaction costs (Liebowitz & Stephen, 1994; 1995). However, rather than systematically considering the influence of network externalities, previous studies have applied only transaction costs to policy diffusion. Future studies need to apply network externalities to several issues of policy diffusion through empirical studies at various levels such as local, state, national, and international. This study hopes that many diffusion scholars will contribute by systematically exploring the influence of network externalities on policy diffusion, based on hypotheses suggested in this study. In addition, this study has the limitation in that it focuses on policy adoption of policy diffusion process, excluding policy implementation and performance. We hope that the lacuna are filled in future studies.

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